Vol. XXIV DECEMBER 1930 No. 12

The EXCAVATING ENGINEER

IN THIS ISSUE:

Machine Methods Lay 7½ Miles of 36-inch Cast Iron Pipe in 9 Weeks.

New Sea Wall Guards Chicago Drive.

Saluda Project Rivals Muscle Shoals.

Boys Build Excavators.

Call for Bids on 60 to 70 Million Dollar Boulder Project to Be Issued December First.

Front Cover Illustration: The 4 to 9-ton stones for Chicago's new sea wall are laid corner-wise . . . making an almost bound mass. (See Page 576.)

The 1020 a Diesel, too

The sturdy 1020—Bucyrus-Erie's half-yard which has made so many enthusiastic friends as a gas or electric machine — is also a Diesel powered model. Investigate its many cost reducing features.

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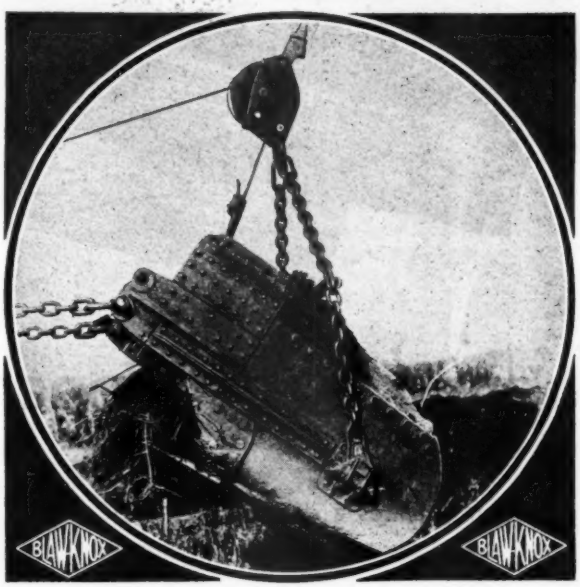

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About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

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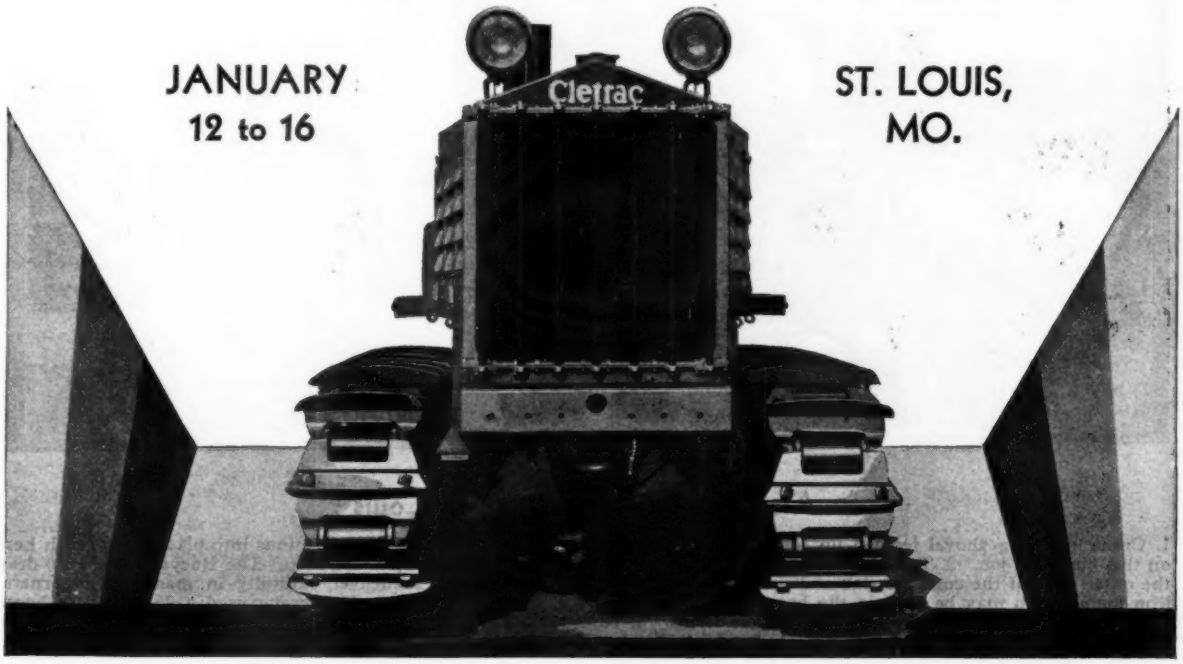

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Along Olive Street Road, St. Louis

1. Crane and drag shovel teamed up to beat the time limit on this hurry-up job. 2. Trench must be excavated between the outer edge of the concrete slab and the old 12-inch cast-iron main which may be seen in the bottom of the trench. Laborers are seen cleaning up the bottom of trench. 3. In many places the dirt had to be dumped into trucks. 4. Lowering one of the 3-ton pipe sections into place. 5. Trench here is 5 feet wide and 10 feet deep. The Bucyrus-Erie 1030 drag shovel had to maneuver skillfully in many tight corners. 6. The Bucyrus-Erie 1030 crane used a 25-foot stub boom for placing pipe and fittings into trench for lowering beneath the low wires which hung over the trench.

The EXCAVATING ENGINEER

Vol. XXIV DECEMBER 1930 No. 12

Machine Methods

W. V. Weir

Lay 7½ Miles of 36-inch Cast Iron Pipe in 9 Weeks

St. Louis County Water Company makes large saving in time and money by adopting mechanical means for excavating for and laying water mains.

LATE in December 1929 the dead line for the completion of an eight-mile line of 36-inch cast iron pipe was set at June 15, 1930. Two mains, a 24-inch and a 20-inch cast iron line were at that time delivering water from the plant on the Missouri River to the distribution system of the St. Louis County Water Company. The capacity of these lines was reached in 1929, so that it became necessary to order, receive, haul and lay over 9000 tons of pipe on Olive Street Road, one of the busiest thoroughfares in St. Louis County, before warm weather set in.

The St. Louis County Water Company supplies twenty-four communities which form the suburbs surrounding the City of St. Louis to the North, West and South. Six hundred miles of water mains cover an area twice the size of St. Louis.

99% Mains Previously Laid by Hand Methods

On January 2, 1930, an application for the permit for laying this main was filed. Immediately thereafter materials were ordered. The United States Pipe and Foundry Company was given the tonnage order for the "Hi-tensile" 36-inch cast iron pipe. Valves were ordered from the Rensselaer Valve Company. Jointing materials were ordered from the Leadite Company.

Inasmuch as the St. Louis County Water Company had laid 99% of its mains by hand methods,

There were, of course, special problems, such as carrying the line through places such as this.

these were seriously considered for this large line. When the decision was reached to use machine instead of hand methods, a drag-shovel excavator was selected over the ladder type trencher, because of the nature of the line which the trench had to follow. To follow a line fifteen feet North of the South line of the road meant cutting into the side hill in places, while in other stretches it had to go in the ditch. Along the entire eight miles the spoil

In 60 days 9000 tons of pipe fittings and valves were unloaded by the Bucyrus-Erie 1030 crane working with 35-foot boom, loaded to trucks and hauled to place with trucks.

had to be deposited on the side of the trench away from the road, often several feet above the roadway. In side hill cuts all the dirt often had to be dumped into trucks, as it would not stay on the steep banks. These conditions were easily met by the Bucyrus-Erie 1030 drag-shovel which made its own road where none existed. The complete accuracy with which the operator could control the movements of the bucket proved the wisdom of the choice in innumerable close places along the job.

Another Bucyrus-Erie 1030 crane was purchased to unload pipe at the railroad, later to lower the same pipe into the trench.

New Trucks Paid For in Profits on This One Job of Handling 9000 Tons of Pipe and Fittings

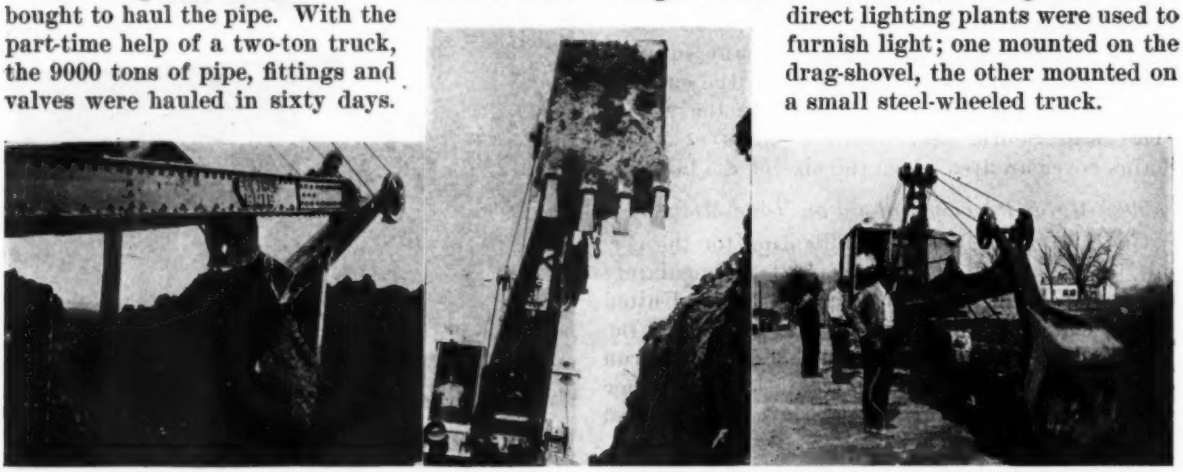
Two long-wheelbase, three-ton trucks were bought to haul the pipe. With the part-time help of a two-ton truck, the 9000 tons of pipe, fittings and valves were hauled in sixty days. Incidentally, unloading with the Bucyrus-Erie crane and hauling with company trucks was done so economically that both new trucks could have been charged off to hauling, still leaving a substantial saving.

In unloading pipe at the siding a 35-foot boom was used on the 1030 crane. For lowering pipe and fittings into the trench a five-foot tip was furnished by the Bucyrus-Erie Company to replace the outer 15-foot boom section. This 25-foot stub boom was a life-saver when it came to lowering three-ton pipe and six-ton gate valves with the end of the boom beneath the low wires of a country telephone system.

300 to 600 Feet of Trench Opened Per Shift

Excavating was done in two shifts of ten hours each. From three to six hundred feet of trench were opened per shift. The trench was 4½ to 5 feet wide, from 7 to 10 feet deep. The 1030 drag-shovel under ordinary conditions could average 60 cubic yards of dirt per hour. This was done by operators who had never seen a drag-shovel boom before. This average yardage could easily be bettered where the machine would be unimpeded by overhead obstructions, and where a decent amount of space would be available for dumping the spoil alongside the trench. For work at night two small direct lighting plants were used to furnish light; one mounted on the drag-shovel, the other mounted on a small steel-wheeled truck.

Fast and accurate, this 1030 crane crowded its partner drag-shovel all through the job.



Digging end of the 1030 Bucyrus-Erie drag shovel. The center view may look like a tooth paste ad but there is no "danger line" in this steel jaw.

Loading Indiana 3-ton dump truck with Bucyrus-Erie 1030 drag shovel.

Pipe-laying Crew with Bucyrus-Erie Crane Demonstrate Ability to Maintain Average of 125 Lengths Per Day

When laying the pipe the 1030 crane traveled just south of the center line of the road, keeping the north half of the road open for traffic at all times. The pipe was picked up from where it lay north of the macadam or concrete pavement and swung into the trench. One-hundred-and-two 12-foot lengths of 36-inch pipe were laid during one nine-hour day, while one-hundred-and-one and ninety-seven pieces were laid on consecutive days. These records were, in every case, dependent upon the amount of trench open, as the crane, without fail, caught the drag-shovel before five o'clock. "Had trench been available," stated Assistant Manager W. V. Weir, "the crane could have maintained an average of 125 lengths per day with a crew made up of the operator, an oiler who also flagged traffic, two pipe men on the top and two in the trench."

Jointing was done with Leadite, enabling a small crew to keep up with the pipe layers. Joints were poured at least three lengths behind the layers.

Backfilling was done immediately after the joints were poured. A Fordson tractor with a side boom and winch first filled the trench about level full. It was then thoroughly flooded, then refilled and tamped with a Cleveland backfiller-tamper.

Fifteen Days Ahead of Schedule

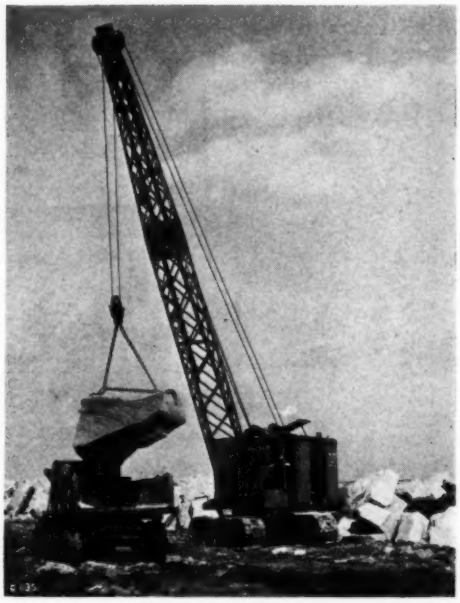
With the dead line originally set at the fifteenth of June, the work bettered the original schedule to such an amount that the last pipe was placed in the trench on May thirtieth. Seven and a half miles of trench was opened and pipe laid in it by the two Bucyrus-Erie machines in nine weeks, no pipe having been laid on Sundays.

The entire work was done by the regular construction men of the St. Louis County Water Company. No additional help other than labor was used. The men responsible for the completion of this main before the time it was urgently needed were W. H. Henby, President and Manager of the St. Louis County Water Company, W. V. Weir, Assistant Manager, Wm. Scott, Superintendent of Street Service, and Geo. Aubuchon, Construction Foreman. Operators on the two Bucyrus-Erie Type 1030 machines were Messrs. Johnson, Winters and Masterson.

750-watt, 150-volt direct lighting plant manufactured by Fairbanks-Morse Co. mounted on the drag shovel for night work.

New Sea Wall Guards Chicago Drive

The Gerlach Company uses Gas+Air crane to place 1,000 tons of stone per eight hours.



Twelve Macks bringing 1,000 tons of stone in eight hours keep the Gas + Air Crane on the jump.

◆ ◆ ◆ ◆

FAVORABLY compared with Havana's Mal a Con and the highway to the Riviera in France, Chicago's Outer Drives along the shore of Lake Michigan have been a delight to Chicagoans and visitors to this great Metropolis of the West. But winter storms have in the past played havoc with these along-the-shore boulevards. Last winter (1929-30) sections of the Outer Drive along the north shore, built and maintained by the Lincoln Park Board of Commissioners, were completely demolished by the terrific force of Lake Michigan's waves and ice, the damage totalling in the neighborhood of a half million dollars. Obviously repairing this damage would hardly be justified, unless protective measures could be taken to guard against the storms of future winters.

60,000 Tons of Rock in New Sea Wall

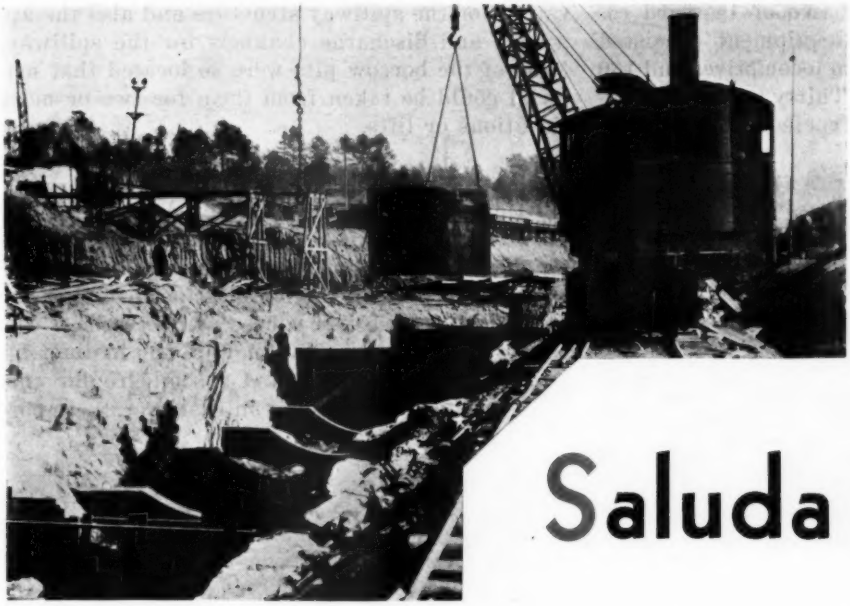
Imbued with Chicago's spirit of "I will" the Lincoln Park Commissioners determined to build a permanent barrier as a protection for the beach drive and the adjacent golf course. A sea wall of dimension stone, weighing from 4 to 9 tons each, was planned and contract for placing let to The Gerlach Company, one of the leading Chicago contractors specializing in excavation. A total of 60,000 tons of stone was called for to be laid over a distance of two and one-half miles. The pieces of stone are laid corner wise, each piece being jammed closely against the others, making an almost bound mass.

A Bucyrus-Erie Gas + Air crane was installed by

(Continued on page 606.)

P & A Photo

Mighty Lake Michigan's fury cares not for Chicago's Outer Drives nor for the beauty of Lincoln Park. To prevent just such havoc as this October, 1929, storm caused, 60,000 tons of stone are being placed by The Gerlach Company.



Placing a section of steel pipes No. 4, eight feet long and half the circumference of the 16-foot pipes.

Saluda Project Rivals Muscle Shoals

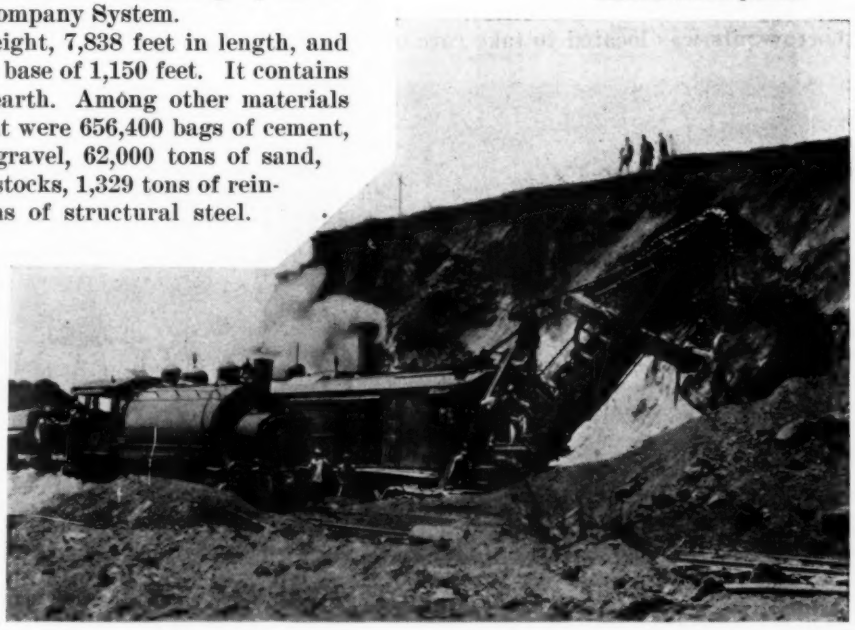
Arundel Corporation places eleven million yards of dirt across Saluda River to form power-giving lake with shore line of 520 miles.

By J. D. WOOTEN

THE largest earthen dam in the world for a privately owned hydro-electric development has recently been completed on the Saluda River, near Columbia, South Carolina, by W. S. Barstow & Company, Inc., and subcontractors, for the Lexington Water Power Company of the Associated Gas & Electric Company System.

The dam is 208 feet in height, 7,838 feet in length, and has a maximum width at its base of 1,150 feet. It contains 11,000,000 cubic yards of earth. Among other materials required for the development were 656,400 bags of cement, 122,012 tons of stone and gravel, 62,000 tons of sand, 3,987 tons of steel plate penstocks, 1,329 tons of reinforcing steel and 2,240 tons of structural steel.

Bucyrus-Erie shovel on duty in borrow pit at the Saluda Hydro-Electric Development.



The Arundel Corporation of Baltimore, Maryland, subcontractors for the construction of the dam, working day and night, five and one-half days per week, used seven Bucyrus-Erie, Marion and Thew steam shovels to load 11,000,000 cubic yards of material for the earth fill. Three of these shovels were of 4-yard capacity, one of 2½-yard capacity,

one of 2-yard capacity, and two of 1¾-yard capacity. The transportation equipment consisted of seven standard gauge steam locomotives and 160 standard gauge dump cars. Thirty miles of standard gauge track was constructed for transportation and placing of earth-fill materials. The maximum day's production was 32,172 cubic yards; the maximum month (July, 1929) 701,217 cubic yards.

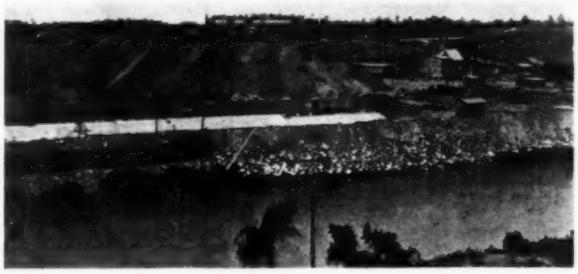
Progress view of work of the spillway.

The borrow pits were carefully selected for elevation and location with respect to the dam site. Test pits were dug, and samples of the earth were submitted a sufficient length of time in advance to permit determination of its suitability for use in the earth fill.

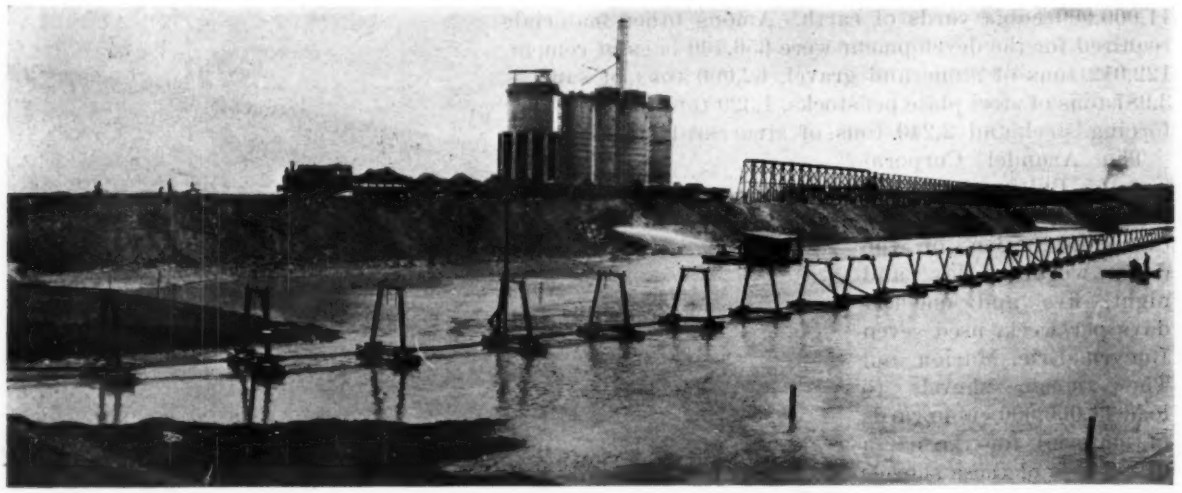
It was found that the material could be obtained from borrow pits with an average haul of one mile from the dam site, and that the dam would require 6,818 acre feet of earth (or 6,818 acres of earth one foot deep). The average borrow pit was dug approximately 20 feet deep. One of the larger borrow pits was located to take care of the excavation for the spillway structure and also the approach and discharge channels for the spillway. Most of the borrow pits were so located that material could be taken from them for two or more elevations or lifts.

Conduits Divert Water

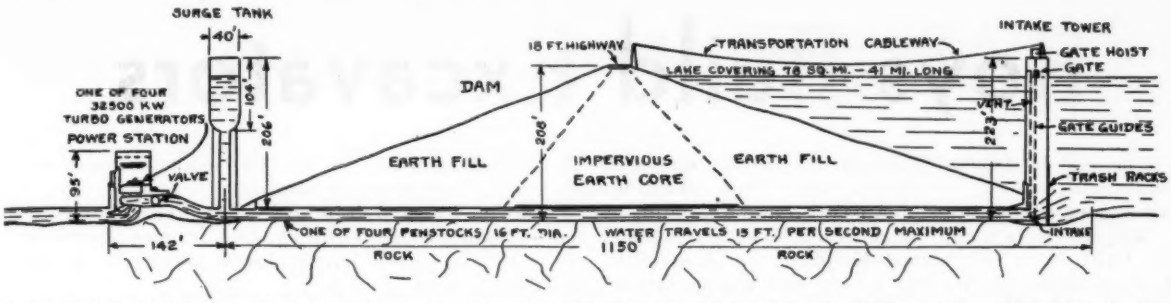
After the preliminary survey had been completed and work was begun on clearing the land in the dam area, the contractors directed their attention to the placing of conduits for diverting the river from its natural course while the dam was being built. Four conduits, each 16 feet in diameter and 986 feet in length, and a semi-circular concrete arch conduit, 48 feet in diameter, were constructed. The arch is of sufficient size so that two additional penstocks can be installed when the capacity of the power house is increased. The steel pipe conduits, after serving their purpose in diverting the water, serve as penstocks for the four water-wheel units initially installed in the power house. The conduits were delivered at the dam site in semi-circular sections, eight feet long. Each conduit was made up of 256 sections or 128 rings, and upon completion of erection were incased in concrete with a thickness varying from



Looking northeast, showing earth-fill work progressing from stub trestles in the northeast quadrant.



Segregation pool, showing upper and lower third of the dam. In particles of dirt from outer edges

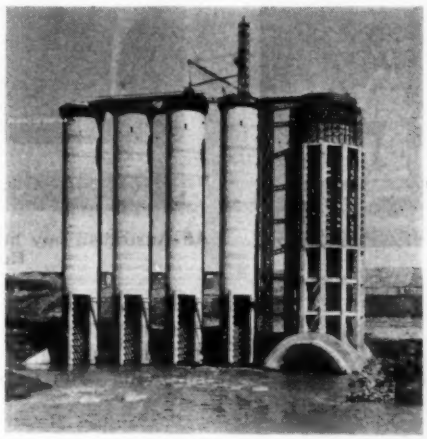


Cross section of dam, showing dimensions, character of construction, location of power station and method of operation.

2 feet 3 inches to 4 feet 6 inches on center line of the dam.

Owing to the weight of the concrete as it was poured over these conduits, it was necessary to brace the interior of each pipe to hold them to a true circle. Approximately nine thousand pieces of lumber of various lengths and shapes—over one million board feet—were used in each conduit for this purpose.

While the steel conduits and the arch conduit were being placed, erection work was started on five intake towers. These towers provide a structure to house the mechanism for hoisting the gates which permit the waters of the lake to enter the 16-foot penstocks, also trash racks which prevent refuse and debris from going into the turbines. Four of the intake towers are 30 feet in diameter and 223 feet high. The fifth intake tower has an outside diameter of 60 feet, is 223 feet in height, and is equipped with gates to admit the lake waters into the 48-foot semi-circular concrete arch conduit.



Intake towers, each of which are 233 feet in height. Through the penstocks of these towers the Saluda River is now flowing.

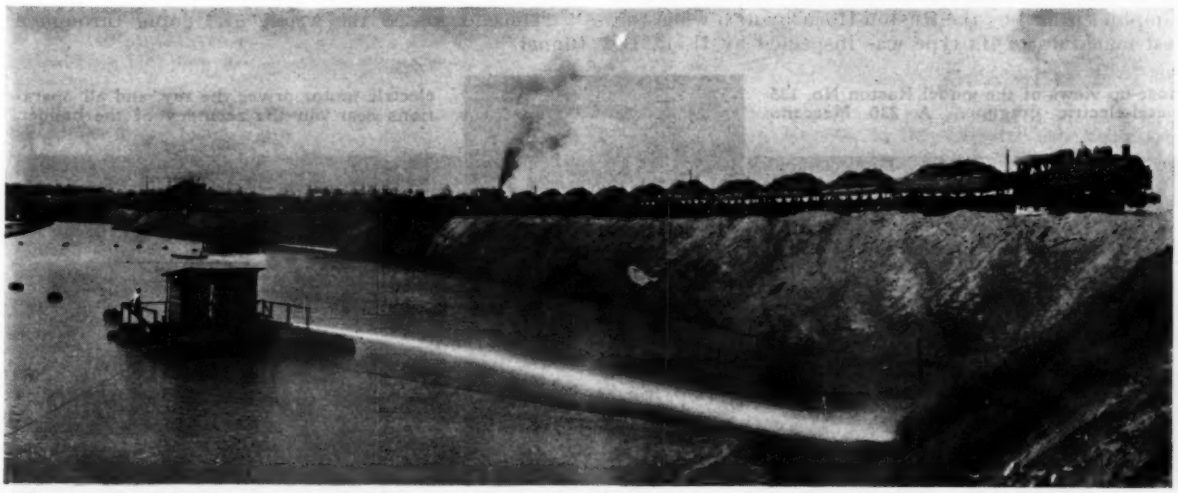
Dam Construction Is Semi-Hydraulic Fill

The dam is of the semi-hydraulic type, in which the middle third is formed by sluicing fine earth to form the impervious clay core. The dam is embedded deeply into adjacent hills, the safest kind of construction known to engineering for existing conditions at the Saluda Dam site.

In constructing the dam it was divided into three sections, namely, upstream third, middle third, and downstream third. For some months the contractors built the upstream and downstream thirds of the dam with earth fill. Between these earth dikes a segregation pool was created into which materials were washed hydraulically from the adjacent banks to form the core.

The initial step in making this core was to strip

(Continued on page 587.)



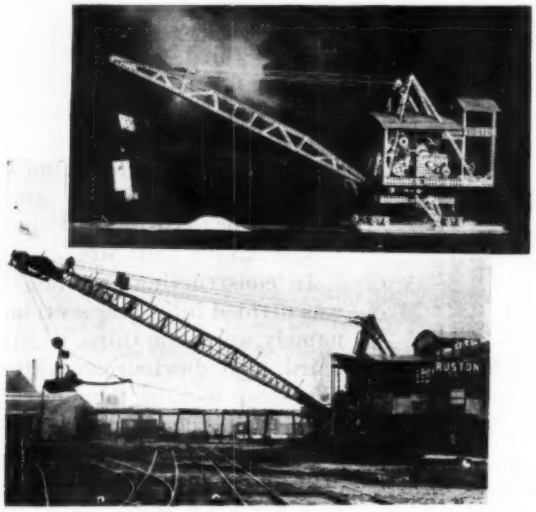
this pool the middle third of the dam is formed by washing fine to form the core of the dam.

Boys Build Excavators

The accompanying illustrations show some unusual achievements in model shovel and dragline building by school boys in Australia and England.

The shovel is a copy of a Model 300 Ruston, and was built by a boy named Keightley in Australia. It is not power-driven, but a very realistic imitation of steam power has been obtained. The model is approximately four feet in height, and the length of the superstructure, two feet.

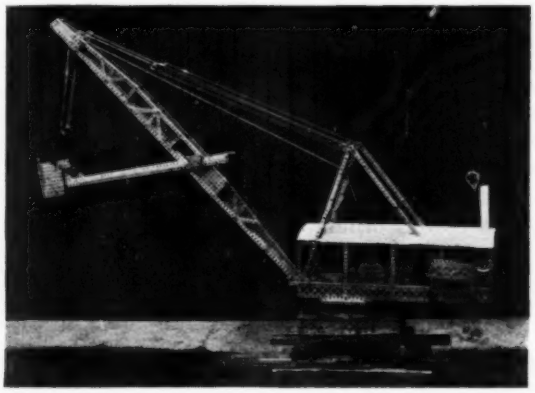
The illustrations of the model dragline, furnished through the courtesy of Meccano, Limited, show a copy of a Ruston No. 135 Diesel-electric dragline built by a Lincoln, England, school boy, 17 years of age.



Above: This model Diesel-electric dragline, the work of a 17-year-old English schoolboy, is built to a scale of ½ inch to one foot. Below: The real Ruston No. 135 Diesel-electric dragline.

He had little data to work on, all his information being obtained from a few old photographs and a pamphlet issued by the Ruston-Hornsby firm when the first machines of its type was inspected by H. R. H. The Prince of Wales K. G. The model is built to a scale of ½-inch equal to one foot.

The model is driven by a 230 Meccano electric motor from the main supply, and all movements are controlled by seven levers placed in correct driving position.



An Australian boy built this four-foot high model of a 300 Ruston steam shovel.

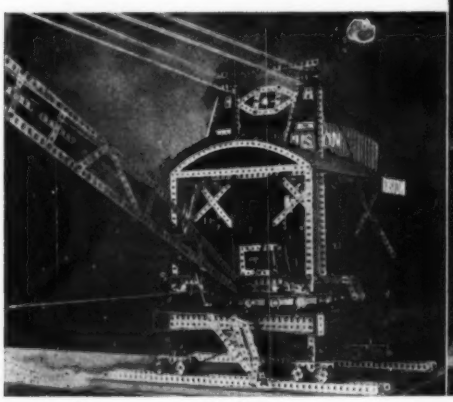
The extraordinary accuracy and care with which this miniature has been modeled on its prototype, and its real digging capacity may be gathered from the following brief particulars:

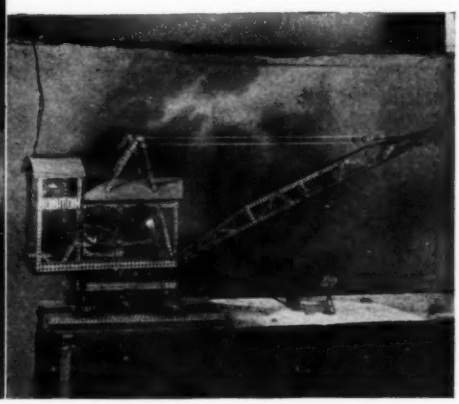
Model	No. 135 Diesel-Electric	Remarks
Working weight, 44 lbs. approx.	230 tons approx.	¼ lb. to 1 ton, approx.
Bucket capacity, 15.2 oz.	3.75 tons	Above scale 15.2 oz.—3.8 tons
Cycle of operations, 57 secs.	54 secs.	
Travelling speed, 1 inch per sec. (approx.)	0.5 m.p.h.	On scale ½ in. = 1 ft.
Climbing, 1 in 10 gradient	1 in 10 gradient	Speed = 1⅓ m.p.h.

"Were you ever in a railway disaster?"

"Once, I kissed the wrong girl going through a tunnel."

Close-up views of the model Ruston No. 135 Diesel-electric dragline. A 230 Meccano electric motor drives the toy, and all operations bear out the accuracy of the builder.





Call for Bids on 60 to 70 Million Dollar Boulder Project to Be Issued December 1st

AS A PART of the program for accelerating construction and providing relief for unemployment, the Reclamation Service of the Department of the Interior has speeded up its preparation of plans looking toward the construction of Hoover Dam, on the Colorado River, and announces that the various large contracts in that connection will be let months in advance of the dates contemplated a few weeks ago. Information has just reached Secretary Wilbur to the effect that some $3,000,000 worth of contracts will be advertised on November 15 and that as soon as the bids are in and the contracts awarded 500 men will be put to work.

The site for the new town of Boulder, covering an area of approximately one section, lies directly back of the tents where the engineers and surveyors are now quartered. The survey has been completed and the plans are now being drawn for its construction.

Track is already being laid for the branch of the Union Pacific Railroad that will run out to the town which is to be built at the top of the divide looking down upon the damsite. The ground plan of the model town is already designed, and streets and railway sidings will soon be under construction. Houses for Government employees and Government office buildings are being designed by architects especially skilled in construction suitable to desert use. Some $200,000 will be spent in Government-owned buildings in this town. Many other buildings will be constructed to house the workers employed by contractors.

A water supply for the town must be provided and bids for the contract will be asked very soon. This water will be pumped from the river, 2,000 feet below the town. Since the town, sitting in the midst of a desert, must have sufficient water to provide irrigation for what vegetation will be grown, the plant must be a quite ambitious one. Laborers are expected to be working like beavers upon the plant by the middle of winter.

Specifications for the construction of a wagon road some six miles over very rough terrain are being rushed, and it is expected that they will be ready to submit to contractors by the 15th of November. This road will cost somewhere around $300,000.

Specifications are likewise being hurried forward for the construction by the Government of a railroad covering this same mountainous six miles and bringing freight necessary for construction to the rim of Black Canyon. This road will cost something near $1,000,000. Every man that can be used will be kept on these jobs, because their completion is necessary before construction can proceed on the dam proper. By driving hard enough, however, it is thought that they can be completed in two or three months after the contracts are let.

The contract to supply the power necessary in carrying out the construction work at the dam has already been let and calls for the construction of a power line from the Los Angeles area to the damsite. Already this line is being built, and will be pushed at top speed that it also may reach the damsite by the time transportation facilities to it are available.

These works are but preliminary to the great task of constructing the dam itself, an undertaking of ten times the magnitude of any dam that has ever been built. The Department of the Interior announces that it expects the specifications for Hoover Dam to be ready by December first, and that a call for bids for the great undertaking will be issued at that time.

The first of the tasks at the damsite will be that of driving four tunnels, each 50 feet in diameter and about one mile long, through the solid volcanic rock cliffs on each side of the canyon. These tunnels alone will cost from 15 to 20 million dollars.

The grade at "Railroad Pass," the summit of the new line from Las Vegas, Nevada, to the damsite. Air drills are putting down blasting holes—note the compressor in the shade of the shed. The shovel parts at the extreme right will not have to wait long before the rest of the shovel is brought in to make the rock fly.

When these tunnels are completed, a cofferdam 80 feet high will be constructed some distance above the site of the permanent dam, and a similar one below the damsite; their purpose will be, to divert the water, no matter how great the floods through the four great tunnels during the time of construction. This will leave the river bed between the cofferdams dry.

The initial task at the actual damsite will be to remove from the bed of the river the loose boulders and dirt that lies above bed rock. This loose material is from 100 to 150 feet thick, and it will be a Hercu-

lean task to sweep the bed rock clean of it. Not until the tunnels are completed, the river diverted, and the bed rock exposed, can the actual construction of the dam itself begin. Starting at bed rock this great concrete structure, 650 feet long at the base, sloping to a width of 45 feet at the top, will begin to arise to its ultimate height of 727 feet. Here it will constitute a span 650 feet long over which a transcontinental highway will pass. Building this wedge which reunites the ends of a severed mountain chain will be the final task to be figured on by contractors.

Originally it was thought that it might be wise to let the different items in this final undertaking of dam construction to different contractors. One firm might drive the tunnels on one side of the canyon and another firm those on the other side. A different contractor might build the cofferdam, might excavate for the great dam, might erect that dam. After careful study and consultation with the leading contractors of the nation, however, it was decided that this entire undertaking, through the elimination of duplication, could be more economically handled as a single project.

The bids for this huge contract will call for the expenditure of 60 to 70 million dollars. Not many

At the present time contractors are working on the new railroad grade in four different places, using power shovels where the formation is rock and teams in the soft earth of the desert.

contracts of this size have been let in the history of the United States. It is known, however, that there are a score of contractors in this country who are capable of handling an undertaking of this size and a number of bids are expected.

Ninety days will be given contractors to submit their bids. The contract, therefore, is expected to be let about March first. In the meantime the preliminary contracts, bringing transportation to the damsite, providing power, living quarters, water supply, etc., will have been executed.

The first contract to be let will include the 727-foot dam, the four 50-foot diameter diversion tunnels, the cofferdams and the power plant (except installation of machinery). It is planned to open bids for this work before March first, if possible. The principal items and approximate quantities involved are as follows:

1,800,000 cubic yards all classes of open-cut excavation;
1,900,000 cubic yards of tunnel and shaft excavation;
1,200,000 cubic yards of earth and rock fill in cofferdams and river channel protection;
4,400,000 cubic yards of concrete;
228,000 cubic feet of grout;
Placing 5,500,000 pounds of reinforcement bars;
Drilling 190,000 lineal feet of grout and drainage holes;
Installing 1,900,000 pounds of small metal pipe and fittings;
Installing 32,500,000 pounds of large metal conduits;
Installing 10,600,000 pounds of structural steel; and
Installing 20,000,000 pounds of gates, hoists and other metal work.

Specifications will be forwarded to Washington for printing by the Denver office of the Bureau of Reclamation about November 15, covering the construction of the Government portion of the construction railroad. This section is about 10½ miles in length, and will extend from the summit, the end of the Los Angeles and Salt Lake Railroad Company section down to the dam site. Among the principal items and approximate quantities involved are:

115,000 cubic yards of common excavation;
364,000 cubic yards of rock excavation;
163,000 cubic yards of unclassified borrow;
803,000 station cubic yards of overhaul;
287,000 cubic yards of long haul unclassified borrow "loaded into hauling equipment";
705,000 yard miles of hauling and spreading "long haul unclassified borrow";
29,000 cubic yards of tunnel excavation;
800 cubic yards of structure excavation, common;
1,200 cubic yards of structure excavation, rock;
6,000 cubic yards of rockfill;
220 cubic yards of concrete;
16,000 pounds of reinforcement steel;
2,100 cubic yards of rock riprap;
2,600 cubic yards of concrete cribwall;
2,980 lineal feet of corrugated pipe;
22,800 cubic yards of ballasting.

The Denver office will forward to Washington for printing about November 20 specifications for construction of an 8-mile highway from Boulder City to the site of the Hoover Dam. A large amount of rock excavation is involved in this road construction. Principal items and approximate quantities involved are:

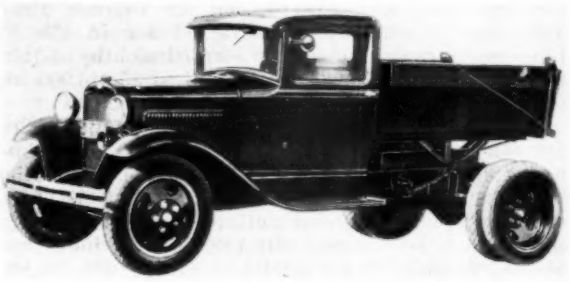
113,000 cubic yards of common excavation;
266,000 cubic yards of rock excavation;
40,000 cubic yards unclassified borrow:
250,000 station cubic yards of overhaul;
6,000 cubic yards of tunnel excavation;
30,000 feet B. M. of tunnel timbering;
1,200 cubic yards of structure excavation, common;
600 cubic yards of structure excavation, rock;
2,100 cubic yards of backfill;
170 cubic yards of concrete;
8,500 pounds of reinforcement steel;
2,500 cubic yards of riprap;
5,000 cubic yards of concrete cribwall;
4,730 lineal feet of corrugated metal culverts;
40,000 cubic yards of gravel surfacing placed;
80,000 station cubic yards of gravel surfacing in stock piles;
8.6 miles of highway treated with oil;
2,700 lineal feet of guard rail.

Specifications and plans are now being prepared for work in Boulder City, covering waterworks, sewer system, lighting system; also buildings for Government employees, including an administration building, dormitory, garage, and several residences.

EQUIPMENT YOU OUGHT TO KNOW ABOUT

Model AA Ford 1½-Ton Dump Truck

Shown here is the gravity dump body truck, one of five recently added to the Ford line of standard Model AA 1½-ton trucks.



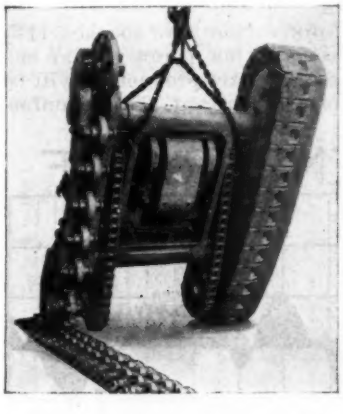
The Ford dump trucks include an hydraulic dump body with one and one-half tons operating capacity; a heavy-duty hydraulic dump body; a mechanical dump body; gravity dump body; and hand dump body.

For further information, write *Ford Motor Company, Detroit, Michigan.* Please mention this magazine.

Improved Caterpillar-Type Mounting

Bucyrus-Erie Company, South Milwaukee, Wis., announces that the E-2 Diesel dragline is now regularly equipped with a new style, improved, caterpillar-type mounting. This mounting comes with standard or special long belts and with special wide treads.

The standard mounting has 27-inch treads, giving an overall width of 10 feet 6 inches, with an overall length of 13 feet 8½ inches and a bearing area of 51.9 square feet. There is also a long truck with 27-inch treads, and this as well as the standard truck can ride on a flat car without removing the treads.



The long truck with the 27-inch treads has the same width as the standard, but is 15 feet and ¾ inches in overall length with a bearing area of 57.9 square feet. Two styles of wide treads are also offered. The standard length truck with wide treads has an overall width of 11 feet 8 inches, with an overall length of 13 feet 8½ inches and a bearing area of 63.3 square feet. This wide-truck, wide-tread mounting also comes in the extra long size, giving a bearing area of 70.8 square feet, with an overall width of 11 feet 8 inches and an overall length of 15 feet ¾ inches.

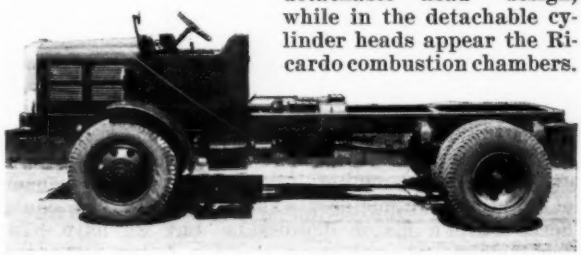
The machine steers from the cab, having several interesting developments for more convenient steering. The new mounting is chain driven, being somewhat similar to the caterpillar mounting used on the 1020 and 1030. For additional information, write Bucyrus-Erie Company, South Milwaukee, Wisconsin. Please mention *The Excavating Engineer.*

FWD Super-Five and Super-Seven Announced

Four Wheel Drive Auto Company, Clintonville, Wisconsin, announces the incorporation of two new FWD's in its line of four-wheel-driven trucks. These two moguls, known as the "Super-Five" and the "Super-Seven," are respectively of five, and seven-and-one-half, tons capacity.

Both have wheel bases of 165 inches, loading space behind cab of 156 inches, and 72 inches tread. The five-ton frame has an overall width of 32 inches, and the Super-Seven of 34 inches, the chassis weighing respectively 11,800 pounds, plus body weight allowance of 2,500 pounds; and 13,000 and 3,000 pounds.

Each has a six-cylinder motor, developing for the five-ton, 102 b.h.p. at 2,000 r.p.m., and for the 7½-ton truck, 127 b.h.p. at 2,000 r.p.m. The cylinders in both motors are of the removable cast-in-pairs, truncated, detachable - head design, while in the detachable cylinder heads appear the Ricardo combustion chambers.



The selective sliding gear, four-speed, main transmission in each, is supplemented by a planetary, two-speed, auxiliary transmission; these give, in combination, a range of eight forward, two reverse speeds, with direct drive in the eighth.

The center differential, a distinctive feature of all FWD's, and which compensates for the difference, under certain conditions, in the rotations between the front and rear axle shafts, is interposed between the front and rear propeller shafts.

For full information write the above, referring to *The Excavating Engineer.*

Sweet Girlish Voice: "Is there no other way?"

Deep Bass Voice: "No other way."

S. G. V. (coming faintly from the auto): "Oh, I can't. Never, never in this dark. I, who am used to the straight road. I will give you my purse, my rings, all of them, if you do not ask me to do this terrible thing."

D. B. V.: "No, young lady, orders is orders. This concrete isn't hardened yet, so you will have to detour."

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THE EXCAVATING ENGINEER PUBLISHING CO.
F. O. Wyse, Manager-Editor Arnold Andrews, Associate Editor
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The Business Situation

LAST month many commentators had reached the conclusion that business had reached its approximate bottom. "Business is scraping bottom," said one well-known authority. This month finds not only the same conviction but considerable comment on the factors which will foretell of increasing activity. In other words the question today does not seem to be "have we reached bottom" but rather "when do we start up."

Of course, there is always the same contingent of calamity howlers, and one cannot help but reflect that the memory of man must indeed be short, when you hear repeated the comment that "business has never been so bad as it is today—the outlook never so gloomy." There is reproduced across the bottom of these two pages a silhouette showing the course of a half century of American business, and it is interesting to note that, as recently as '21, business was at just as low an ebb. And as far as the gloomy outlook is concerned: one only need look back a little over a year to remember that in the middle of '29, when everything was booming, it was the general consensus of opinion that business was so good that we could never have a major depression—but we have had. Today business is so poor that, to follow the same line of reasoning, we will never have an active increase of business—but, we will have. Furthermore, if we look back over the past record we find that, when depressions have lasted as long as this one, the first recovery has been rapid. To be sure no two business cycles are exactly the same, but they have a certain general similarity which must be considered.

Let's look at the factors that tend to promise improvement.

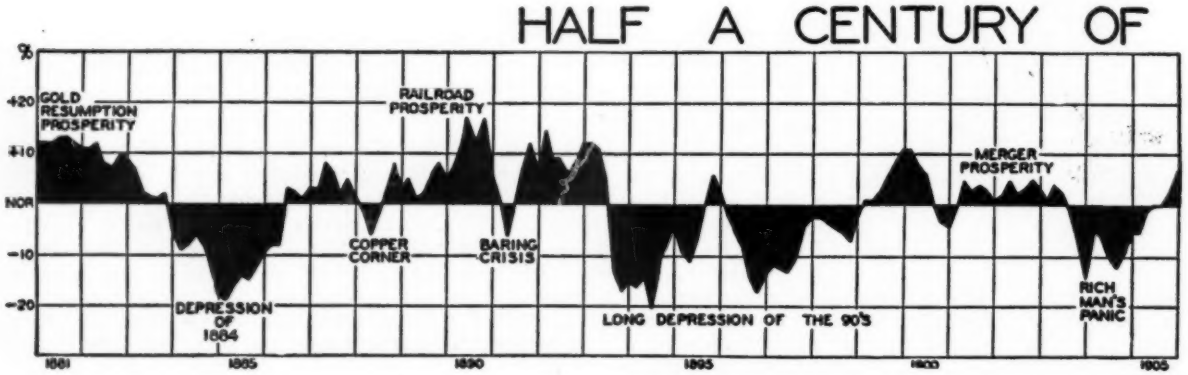
October contracts awarded for new residential building in the 37 states east of the Rocky Mountains were larger than in any month since May, but showed a decline of about 25 per cent from the valuation reported in October 1929, according to F. W. Dodge Corporation. Out of a total new construction volume amounting to $337,301,400, new residential building undertaken during the past month accounted for $104,670,300 or 31 per cent of construction awards of all types in the 37 Eastern states. Total construction undertaken in this territory during October aggregated $337,301,400 as compared with $331,863,500 for September and $445,642,300 for October 1929. Total new construction contracted for in the 37 Eastern states during the ten elapsed months of 1930 was valued at $4,022,024,900 as against $5,046,909,900 for the corresponding ten months of 1929.

The October contract record showed $121,435,200 for non-residential building; $111,195,900 for public works and utilities; and $104,670,300 for residential building. Of the non-residential total, $35,652,600 was for new commercial buildings; $28,554,400 for educational structures; $16,149,900 for industrial plants; $14,553,100 for public buildings; $11,555,800 for hospitals and institutions; $9,583,100 for social and recreational buildings; and $5,386,300 for religious and memorial buildings.

Of the thirteen Dodge territories four showed larger October contracts than in September: the Middle Atlantic, Pittsburgh, New Orleans, and Southeastern districts. Two districts, the Kansas City and St. Louis territories, showed gains in October over both the preceding month and October last year, increases here being due to large pipe line awards. The Central Northwest district, though showing a decline from September, registered a gain over October 1929. The remaining six territories declined from both the preceding month and October of last year.

It is reported that inventories of metals in unfabricated form, are greater than they were at this time last year, but opposed to this is the recent increase in the price of copper and the veritable avalanche of buying that followed the firming of this metal's price. If stocks are large, they apparently are not in the hands of the consumer, and steps are now being taken to curtail production.

December contracts for cotton have touched 11½ cents—up 1.34 cents from the low point. Sugar has responded to indications that over-production will be curbed by advancing some 45 per cent. Tire manufac-



turers are promised better business during the coming year, as evidenced by the fact that gasoline consumption has gone on steadily, while tire purchases have fallen off drastically; obviously many motor vehicles are being run on old rubber that must be replaced in the near future.

Iron and steel has set up an interesting history during the present depression—it has shown less decline in its output and less shrinkage in its earnings than ever before in a similar major business depression. April found 59 per cent of the blast furnaces active, October 41 per cent and November 36 per cent, but at the low point in 1921 the percentage was less than 14 per cent.

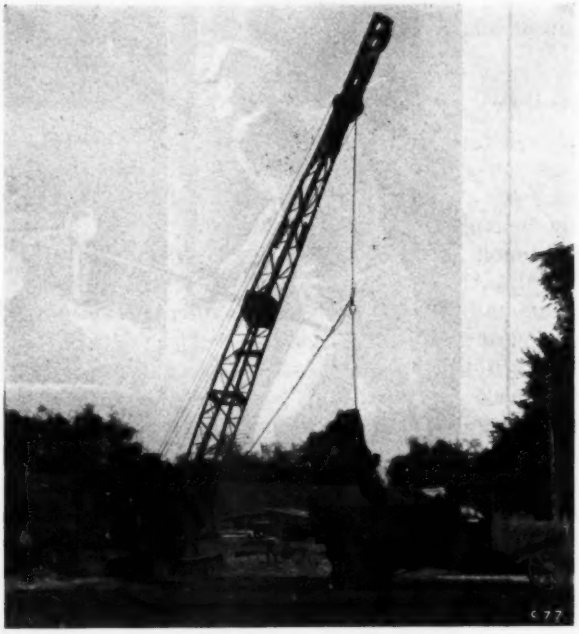
The National City Bank of New York points out, in its bulletin for November, that the present condition is practically world-wide, but look back on the depression of 1921—"Europe exhausted by war and in serious danger of revolution; currencies collapsing; South America and Australia, then as now, acutely affected by the heavy fall in raw material prices; docks and warehouses the world over filled to overflowing with undeliverable American merchandise; banks burdened with protested foreign exchange items; Cuba in moratorium; and in the Far East, Japan suffering from the after-effects of a panic which proved to be the first warning of the coming storm. Yet such conditions, desperate as they appeared at the time, did not prevent recovery, once started, from proceeding at a rate which confounded the pessimists."

Politeness Counts

Politeness as a business asset is recognized by the Northwestern Mutual Life Insurance Company in the construction of a large addition to their home offices in Milwaukee, Wisconsin. The above illustration shows the large sign at the edge of this half block excavation, which was dug by Contractor Ed Radtke using a Northwest and a Moore Speedcrane. We are sure the neighbors of the Northwestern Mutual Life Insurance Company find the noise much softened by the presence of this apologetic signboard.

Starting the Wabash Job in Forest Park, St. Louis

Our cameraman found C. E. Walker's Bucyrus-Erie E-2 Diesel just going in on the A. P. Nolan Construction and Grading Company's job at Forest Park. The work is for the Wabash Railroad and the job will run in the neighborhood of $200,000. One of the

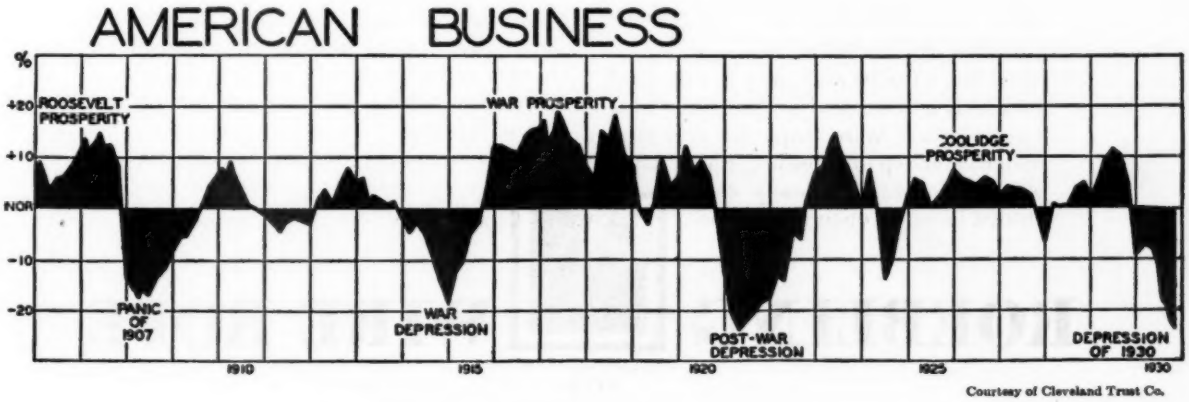


first operations, shown in the picture, was the removing and loading of stumps of large oak trees which formerly grew along the right-of-way. The Bucyrus-Erie D-2 handled these nicely to the A. P. Nolan Sterling trucks, and with this job out of the way was quickly converted to a shovel ready to do real digging.

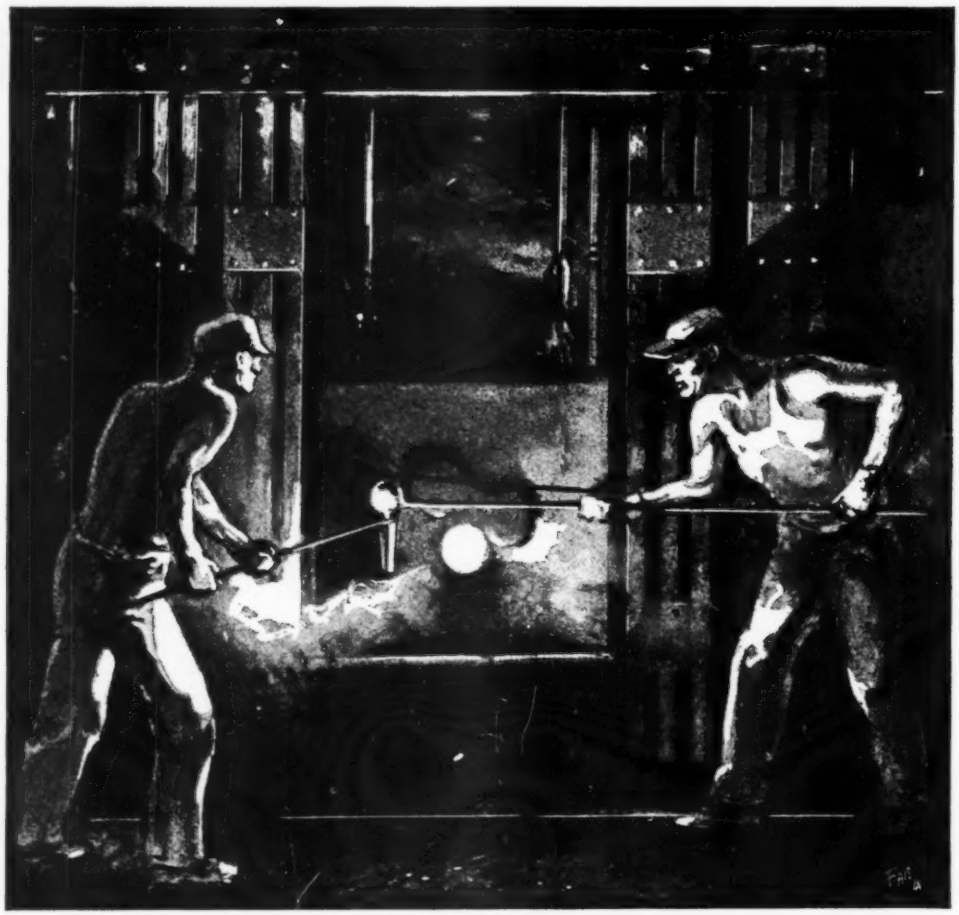
And After the Stitches Were Out

Passerby: "What, excavating this street again?"

Foreman: "Sure, the contractor is a surgeon, and it seems that three steam shovels are missing."



Courtesy of Cleveland Trust Co.



Sampling a melt of Roebling Acid Steel *for laboratory check*

WATCH the open-hearth furnaces in the Roebling steel mill and you will see the pictured procedure repeated time and time again. It is sampling the melt for a chemical check in the laboratory.

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Saluda Project Rivals Muscle Shoals

(Continued from page 579.)

the middle third area of the dam of all sod and loam to an average depth of two feet, to remove all stumps and roots greater than one inch in diameter to a depth of six inches below the surface, and to dig a core trench. The depth of this excavation varied according to the kind of material encountered, but all of it was carried through to impervious soil or rock. After the core trench was dug and the segregation pool was formed, pontoons were pressed into service, each of which were equipped with a 750-gallon-per-minute, electrically-driven, high-pressure pump and a hydraulic "gun." Each "gun" was fitted with a nozzle about one and one-half inches in diameter and threw a stream of water 150 feet. Water from these "guns" was directed on the inside faces of the upstream and downstream dikes, washing the fine particles of clay and sand into the pool, to form the core.

763 Billion Gallons of Water to Be Stored in Gigantic Reservoir

One of the outstanding features of the Saluda River Hydro-Electric Development is the tremendous water storage capacity in the artificial lake.

In general, hydro-electric developments in the South have relatively small storage, and their electrical output consequently fluctuates with stream flow, making it necessary in many instances to supplement these developments by steam electric plants. The large storage capacity of the Saluda Development makes large auxiliary steam capacity unnecessary.

The lake at its highest level is 41 miles long and 14 miles wide at its widest point. It has a shore line of 520 miles and provides storage for 763 billion gallons of water; a sufficient amount to supply 160 cities each of 50,000 population for a period of one year.

The spillway structure foundation is located on solid rock. The earth excavated from the spillway area was used in the fill for the dam.

The spillway overflow is controlled by four Tainter gates, each 25 feet high by 37½ feet wide, giving a total clear opening of 150 feet. The structure is provided to pass excess water from the lake around the dam for its protection during floods. It is estimated that the four gates can release 28,800,000 gallons of water per minute during flood periods.

222,600 Horse Power to Be Initially Developed

The power station will have an initial installation of 222,600 horse power. The structure housing the turbines is built of concrete, steel and brick, and is 250 feet long, 56 feet 6 inches wide and 95 feet high above the operating floor. The initial installation includes four hydraulic turbines whose runners have an outside diameter of 13 feet 1¼ inches and which weigh 30 tons each. They revolve on shafts 29 inches in diameter, weighing 20 tons each. Provision has been made for later installation of two additional water wheels. The total weight of each of the four 32,500 k.w. generators installed, including exciters, is 678,000 pounds, the heaviest part being the rotor and shaft weighing 410,000 pounds.

Before excavating for the foundation of the first turbine unit and the working bay could be started, a cofferdam 70½ feet by 67 feet had to be constructed around the area to be excavated. The first step in building this cofferdam was to construct the necessary interior timber frame supports, which were built up from 12 by 12-inch timbers. The steel sheet piling was driven along the outside face of the framework to bed-rock, which varied from 18 to 24 feet below the top set of timber supports. After the driving of the piling was completed the cofferdam was pumped out and

(Continued on page 606.)

Completed Saluda Hydro-Electric Development according to Artist's conception.

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SHOTS FROM THE FIRING LINE

January Conventions and Expositions

Next month in the City of St. Louis, Missouri, thousands of road builders, quarrymen, sand and gravel producers, manufacturers and others will gather for the three outstanding conventions and expositions of the construction and allied industries.

First and foremost, with respect to size, will be the Convention and Exposition of the American Road Builders' Association. Both the Convention and the Road Show will be held in The Arena, January 12th to 16th inclusive. The National Crushed Stone Association Convention and Exposition will be held at the Jefferson Hotel, January 19th to 22nd, and will be followed January 27, 28 and 29th by the Convention and Exposition of the National Sand and Gravel Association, also at the Jefferson Hotel.

Never before have these three great conventions been held in the same city within a period of 18 days. Railroads have made arrangements to permit visitors to take advantage of the reduced rate convention fare for attending any or all three of these conventions. If you attend, be sure to get a convention certificate when buying your going railroad ticket. According to information from the headquarters of the various Associations, plans are being made for record-breaking gatherings.

Seattle to Alaska Highway

Herbert H. Rice of Detroit, Assistant to the President of General Motors, and Treasurer of and Director in the National Automobile Chamber of Commerce, has been appointed Chairman of the Commission for the United States created to study the construction of a highway to connect the Northwestern part of the United States, with British Columbia, Yukon Territory and Alaska, according to an announcement made today at the Department of the Interior. The other members of this Commission are Ernest Walker Sawyer, representing the Department of the Interior, and Major Malcolm Elliott, of the Army, President of the Alaskan Road Commission.

Information received in Washington, D. C., is to the effect that British Columbia is continuing her exploration of a route of the proposed road 500 miles beyond its present terminus at the famous totem poles of Kisplox, near Hazelton, which itself is 839 miles north of Vancouver. This exploration is being done largely through aviators, photographing from the air, but supplemented by ground surveying parties. The results of the summer's work is now in the hands of Premier Tolmie. The present terminus of the automobile road at Hazelton is 150 miles east of Ketchikan, Alaska, back of the coast range. The route from there on as indicated by these recent survey activities will lead northwesterly to Lake Atlin and will enter Alaska by way of Dawson.

At the northern boundary of British Columbia the road will enter Yukon Territory, and its development through that area will be in the hands of the Canadian Government itself. Survey now actually is proceeding. When it reaches the Alaskan border the completion of the road to Fairbanks will depend upon the Government of the United States.

The mileage that will have to be built in Alaska may not exceed 50 or may run as high as 200, depending upon the point at which entry is made. This short piece of road which will open up a virgin mining section of Alaska will also connect with the main highway system of 2,000 miles already in Alaska. The present activity in the development of this highway has grown out of the trip made last summer under the guidance of Premier Simon Fraser Tolmie, of British Columbia, accompanied by representatives from the United States and from the Chamber of Commerce of Seattle.

The distance from Seattle to Fairbanks is approximately 2,000 miles. When this road is completed a new and novel venture will be offered to the automobile tourist, and one of the greatest gestures of friendship between English-speaking nations will have been consummated. The road will tie into the proposed International Pacific Highway which is planned as the longest road in the world, reaching from Fairbanks to Buenos Aires, toward the other end of South America.

Attention Twenty-Third Engineers

President Doane Eaton (4 Bn. Hdq. Det.) of the Metropolitan New York Society Twenty-third Engineers is anxious to obtain the correct addresses of all former members of the Twenty-third Engineers. Address, 50 Morningside Drive, New York, New York.

Common Brick Manufacturers to Meet February 2nd to 7th

The Common Brick Manufacturers Association of America will hold their annual convention at the Benjamin Franklin Hotel, Philadelphia, February 2nd to 7th, 1931. Because the American Ceramic Exposition will be held in Cleveland in connection with the American Ceramic Society meeting and other clay meetings during the week of February 23rd, 1931, the Common Brick Manufacturers' Association will not have a machinery and equipment exhibit at its coming convention.

The program, however, is an excellent one and deals exclusively with the problems of brick making brought on by present market conditions. The theme of the meeting will be how to make profit in the manufacture of brick on existing conditions.

Canada

The Canadian Pacific and Canadian National Railways are reported to begin immediate construction of branch lines at a cost of **five and one-half million dollars.** These branches were originally scheduled for construction in 1932.

New York Notes

During the first nine months of 1930 **New York State** specified about 10,588,338 cubic yards of unclassified excavation in highway construction, at a cost of approximately $8,881,074.75. The balance of the work to be let this year will increase this amount by about 10%, and the expenditures for 1931 will be as great or greater than those for 1930.

Virginia Notes

BY JOS. S. POTTS, JR.

A. Jones who owns one-third interest in a Bucyrus-Erie Type B, Shop No. 2116, with J. J. Battershill & Son of Virgilina, Virginia, dropped in at the office the other day to sing the praises of this old Type B and its operator Milton Davis. Mr. Jones tells us that he recently used this machine to dig 100,000 cubic yards, and that the total repair bill for the job did not exceed $150.00. From this job he moved to another totaling 45,000 cubic yards, which he handled without any repair bill, not even having to replace a hoist line.

Obeying Orders

A certain mother reproved her young son for always coming to her for his spending money. "Willie, dear, why don't you earn some money yourself?" she said.

The same afternoon the mother, looking out the window, saw her young hopeful surrounded by a group of boys all having a grand time, judging by the whooping and yelling going on. Out of curiosity she went over and saw tacked on a tree by which her son was busily engaged the following sign:

Willie Beasley will eat—

1 small worm for.....1 cent
1 large worm for.....2 cents
1 butterfly for.....3 cents
1 caterpillar for .....3 cents
1 hop-toad for .....5 cents

GATKE LICKS YOUR FRICTION TROUBLES

GATKE—ASBESGRAPHITE licks any friction job day in and day out! It is built to stand the constant grind . . the continual demand for gruelling brake and friction control! It is rugged . . . tough . . . durable . . . obeys every command . . . does the job well . . . proves its economy by refusing to quit!

If you are tired of friction troubles . . . delays . . shutdowns . . GATKE—ASBESGRAPHITE is the surest answer! Regardless of the nature of your friction problem, ASBESGRAPHITE will solve it just as it has hundreds of others.

"After GATKE FRICTIONS were installed, chattering was eliminated, the operator was able to do better work, he could place the bucket exactly where he wanted it!", is characteristic of reports we receive from enthusiastic users of GATKE MOULDED BRAKE AND FRICTION BLOCKS!

Write direct for complete information about GATKE—ASBESGRAPHITE and how it will lick your friction troubles!

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THOMAS L. GATKE, MANUFACTURER.
GENERAL OFFICES: 228 N. La Salle St., Chicago, Illinois.

Please give us complete information about GATKE—ASBESGRAPHITE.

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Address_____

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E. E. 12-30

SHOTS FROM THE FIRING LINE — Continued

New England Notes

BY E. J. O'CONNER

Here's the new plant and quarry of the **Holliston Trap Rock Quarry at Holliston, Massachusetts.** The plant has a 40 x 48 Acme Breaker, a Symons 5½ Cone, Robbins sizing screens and belting, and has a capacity of 1200 tons. Excavating is handled by a Bucyrus-Erie 41-B steam shovel loading into trucks.

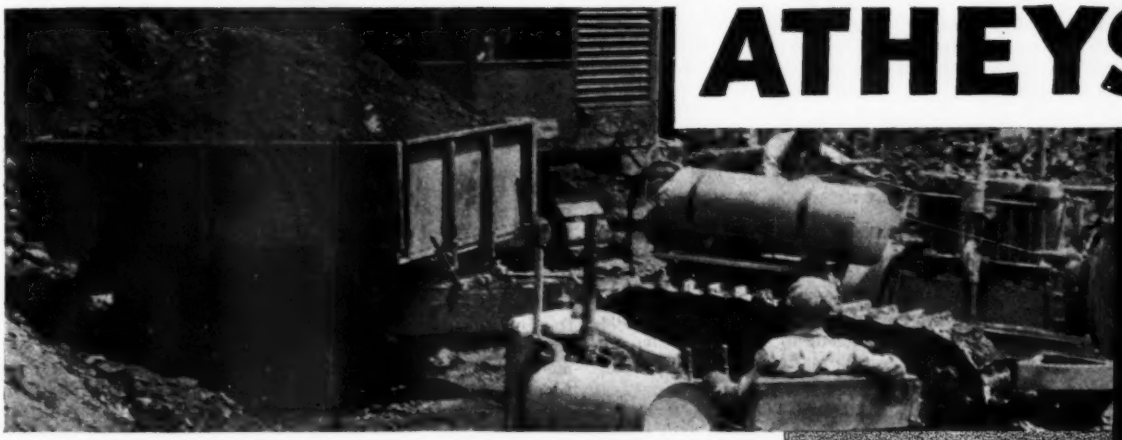
Executives of the Holliston Trap Rock Company include Frank Decrow, President; Les Ennis, Treasurer; F. C. Norton, General Manager; and Al Leighton, Superintendent. A. C. Denton operates the Bucyrus-Erie 41-B.

Baltimore Notes

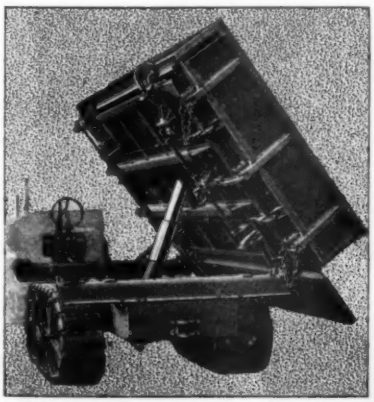
BY F. J. FAIMANN

H. T. Campbell Sons Company of Towson has the contract for the Elkridge Cut-off on the Washington-Baltimore Boulevard. This job consists of 100,000 cubic yards of heavy excavation, some of it being rock. The Campbell Company is using a new Bucyrus-Erie 42-B steam shovel on one end of this contract and a Bucyrus-Erie GA-2 at the other end. The

why you should use ATHEYS



Put ATHEY Equipment to work for you and you'll find dozens of reasons why you should use ATHEYS. • • • • You'll realize how carefully tremendous strength has been secured without excess weight; • • • • —how their ability to dump to the right, left or rear—and their large capacities—speed up operations; • • • • —how their light-running qualities allow the tractors to operate at top speeds and yet save materially on tractor operating and maintenance costs; • • • • —how favorably their length of life compares with that of a tractor and how easily and inexpensively those parts subject to normal wear, can be replaced; • • • • —how definitely ATHEYS are revolutionizing the dirt moving industry.



Over 50,000 ATHEY TRUSS WHEELS have seen service all over the world and under all operating conditions. ATHEY TRUSS WHEEL 3-way Dump Trailers offer YOU tremendous hauling economies and operating advantages. • • • • • It will pay you to write for complete ATHEY Facts. • • • Do it today.

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130 N. Wells St., Chicago, U. S. A.
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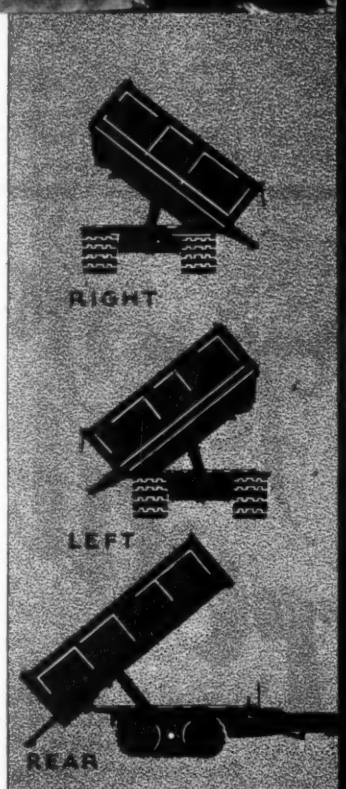
The Baldwin Locomotive Works, Foreign Representatives, Philadelphia, Pa.



IT DUMPS TO THE RIGHT, LEFT, OR REAR

Athey

TRUSS WHEEL EQUIPMENT

For your convenience in writing Athey Truss Wheel Co. you will find a card bound in this issue.

SHOTS FROM THE FIRING LINE — Continued

42-B machine is loading into 10-yard Biehl wagons, which are being drawn by "Sixty" Caterpillar Tractors. The average haul is about 500 feet, and the 42-B has been going along steadily, making four to five swings per minute, and though not yet having an opportunity to open up for a full day has been digging 1500 yards or better per day. This 42-B machine was taken out of the Campbell Company's Texas, Maryland, quarry to go on this project. The above illustration shows the operation of the 42-B machine, working in an old iron ore dump. Bill Grier is the engineer on this shovel, while John Dunn is handling the GA-2. The work is under the direct supervision of Messrs. Bruce and Guy Campbell.

Buffalo Notes

BY D. E. WHITE

FRED W. KNICKENBERG

Fred W. Knickenberg, one of the oldest and best-known contractors in Buffalo, New York, recently passed away in his 71st year. He was actively engaged up until the time of his death and will be missed by his many friends.

WILLIAM B. WARRINGTON

William B. Warrington, who, for many years was Test Engineer for the Erie Steam Shovel Company and of late was employed by Paul R. Beals Construction Company, Deposit, New York, passed away on November 9, 1930, in his 62nd year. Mr. Warrington was well known for his good nature and kindly disposition, and will be missed by his many friends throughout the country.

Ohio Notes

BY W. W. GOETZ

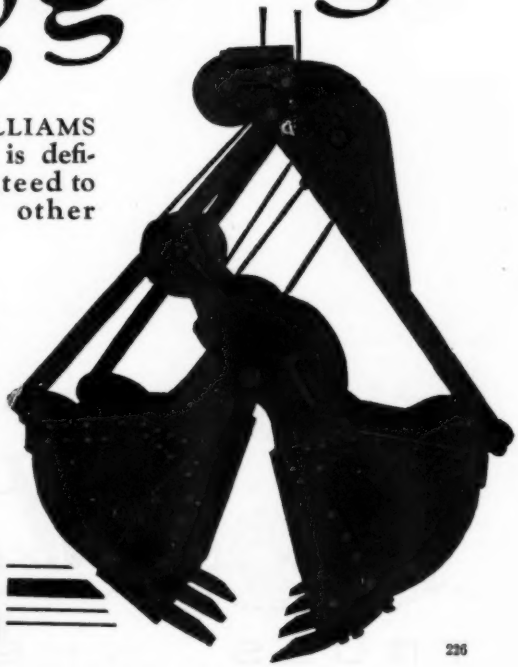
The Woodville Lime Products Company of Woodville use the Bucyrus-Erie 120-B electric shown above to increase the efficiency of their quarry operations. This 4-yard shovel immediately after its installation demonstrated its ability to furnish any tonnage which the plant could handle, and, in fact, is furnishing more rock at a much lower cost than the two three-yard Atlantic railroad shovels it replaced could produce when working to capacity. The use of the 120-B also permits a more efficient and economical method of shooting. Dr. Rex, manager of operations of the Woodville Lime Products Company, expressed satisfaction not only with the production ratio of the shovel but also with its low cost of operation and the service he has secured on such minor service items as have been necessary in the past nine months of operation.

"For your real digging!"

The new WILLIAMS "Champion" is definitely guaranteed to outdig any other bucket built.

You can dig much harder material with the new WILLIAMS "Champion" than with any other bucket, and save dynamite, because—
The dynamite's in the bucket.
Make any tests you want, on your own work. A *real Champion welcomes competition!*

G. H. WILLIAMS COMPANY
603 Haybarger Lane, Erie, Pa.
Branch Offices: New York, Pittsburgh, Chicago



WILLIAMS
BUCKETS—TRAILERS

226

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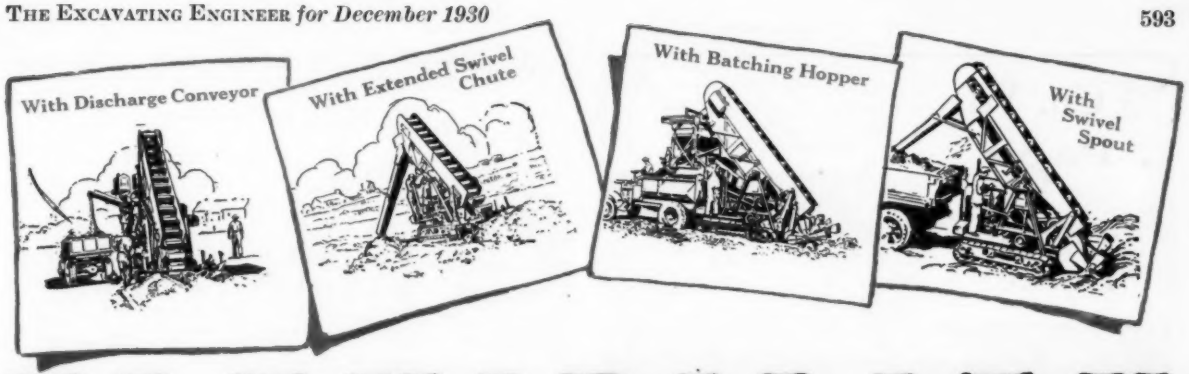


FLEXIBILITY

Think of the ways you can use the machine!

1. SHALLOW GRADING AND EXCAVATION — That's what it was built for—and *it does the work.* Anything up to a 4 ft. cut in anything into which you can drive a pick. The "Excavator" has made money for grading contractors on a wide variety of jobs.

2. STOCKPILE LOADING — Why not—if you're not using the machine elsewhere? You'll underload the engine, it's true; but you'll handle material fast, and at a lower cost than if you tie up a crane.

3. BATCHING AGGREGATES — Certainly you can mount a batching hopper, just as with a Model 27 Haiss Loader—either Volume or Weighing type. A number of "Excavators" have been kept busy, in this way, after their grading job was done.

Learn more about Haiss "Excavator" —you may make money out of the closer acquaintance

George Haiss Manufacturing Co. Inc.
144th St. and Park Ave., New York.

Send along your "Excavator" Catalog marked for my attention.

Name.....

Address.....

HAISS EXCAVATOR

H-699

Also Builders of PORTABLE BELT CONVEYORS, CLAMSHELL BUCKETS, ELEVATORS, SCREENS, etc.

In writing to Geo. Haiss Mfg. Co., Inc., please use post card bound in the center of this number.

3 Cu. Yd.
Page
Drag Line
Bucket

On levee contract of the Canal Construction Co., Memphis, Tenn.

This load was picked up in the length of the bucket. Re-handling earth is often a problem, but this Page Bucket always gets a load without crowding the dump out ahead, and it gets it quick.

There is a Page Dragline Bucket for your job. Write

PAGE ENGINEERING CO. Clearing P. O. Chicago – Ill.

DRAG SHOVELS—DRAG LINES—BUCKETS—SLACK LINES—DIESEL ENGINES

Boilers to Meet Every Engineering Need

When you have a new job, different and difficult . . . when you must work in a new location under difficult working conditions . . . no matter what the job, we can build a boiler to meet your needs . . . a boiler that will give you power, speed, durability, rugged strength and efficiency.

Johnston Boilers have proven their value on engineering projects the world over. They are built by an organization that has been building good boilers for over 65 years. When you have a boiler problem you may find our experience worth while. Call on us then.

JOHNSTON BROS., INC. FERRYSBURG, MICH.
Box No. 310
Specializing in Boilers for Contractors' Equipment

SHOTS FROM THE FIRING LINE — Continued

Pittsburgh and Vicinity

Here, on the edge of the dump, is part of the fleet of nine Linn Tractors used by **R. H. Cunningham & Sons Company** of Turtle Creek, Pennsylvania, in excavating the difficult Moss Side Boulevard project in the foothills of the Alleghenys near Pittsburgh. The job called for moving 350,000 cubic yards of earth and rock.

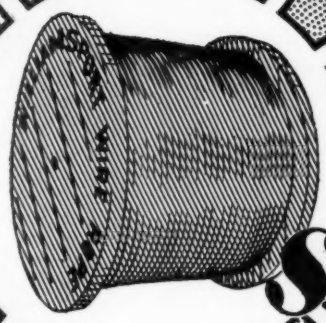
Chicago Notes

BY L. E. MAC DONALD

For several years Lincoln Park, Chicago, has had what might be termed a dub 9-hole golf course at the southern end of the park. Now a new course is being built at the northern end of the park designed to give really good golfers something to think about. Floodlights will permit play until 10:00 o'clock at night. The above illustration shows operations of the **Geo. Callahan's Sons** who are using their Gas + Air Bucyrus-Erie shovel loading to Caterpillar 60's hauling Euclid wagons in grading for this new course and a bridle path which will accompany it. The course will extend from 39th to 47th Streets, a distance of about 2400 feet, and will be about 1000 feet wide. Grading was completed in four weeks. The bridle path extends along the lake shore. Bill Iverson is the operator of the Gas + Air.

At this writing the new Century of Progress Building for the Chicago World's Fair is almost completed. The above picture, taken in August, shows the excavating operation for this building, located at the Outer Drive and Roosevelt Road, under way. The excavating was handled by **The Gerlach Company,** well-known Chicago dirt movers. In the center the Gerlach Bucyrus-Erie Gas + Air, operated by Frank Lynch, is loading into a La Plant-Choate wagon hauled by a Caterpillar 60. In the background at the right is Gerlach's B-2 Bucyrus-Erie steamer, operated by "Smokie" Henwood, loading to trucks. In the stretch of water between the mainland

Williamsport WIRE ROPE Stands Out



As "Sterling" means something to you on silver—so should

"WILLIAMSPORT"

similarly guide you to Wire Rope quality!

The one outstanding thing in the great plant at Williamsport is the determination of all employees to make every rope bearing the name "Williamsport" with the same exacting care that would be expected from the manufacture of precision instruments.

Pride in manufacture and in the product is truly reflected by the satisfaction of and confidence placed in Williamsport Wire Rope by the user.

Williamsport Wire Rope Company

Main Office and Works: Williamsport, Pa.

General Sales Offices: Peoples Gas Bldg., Chicago

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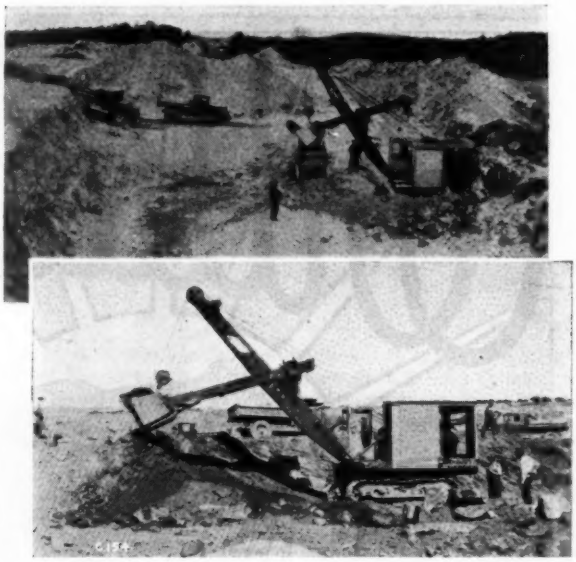
SHOTS FROM THE FIRING LINE — Continued

and the island may be seen Eugene McDonald's famous Diesel yacht the "Mizpah." The man-made island in the background will be a part of the World's Fair grounds, and will make a wonderful location for the parks and beautiful buildings to be erected there.

Wisconsin Notes

BY C. W. HAY

Nelson, Mullen and Nelson of Minneapolis have a nice little job of some odd 150,000 yards grading Highway 47 near Antigo, Wisconsin. Walter Nelson is in charge of the work on which they are making excellent progress. The above view shows the neat job that operator Walter Hammer is turning out with their Bucyrus-Erie Gas + Air in digging ditch and trimming the side slope. It's 14 feet from the grade shoulder to the bottom of the ditch. Caterpillar tractors and Athey-mounted dumps carry the dirt to the fill.



Wood County is doing considerable road surfacing this year with disintegrated granite. Here we see their two Bucyrus-Erie 1030's loading from pits to their fleet of Chevrolet and Four-Wheel-Drive trucks. The new "Chevy's" are equipped with Anthony truck bodies. Operator Max Eberhart was transferred to the second machine when it was installed, so he happens to be at the levers in both views.

Motherly Old Lady (to small boy): "My dear, does your mother know you smoke?"

Small Boy (coldly): "Madam, does your husband know you speak to strange men?"

Reduce Your Repair Bills With Quick Repair Washers

Send us an order for one of these washers—give it a trial—the first repair will save you more than the cost of a year's supply.

These washers will keep your pinions and gears in mesh, saving much wear and tear and reducing repair costs.

QUICK REPAIR WASHERS are cheap insurance against costly shutdowns and delays.

These washers can be put on a shaft easily and quickly without the delay and expense of dismantling shafts or other machinery parts.

They will stand up under the heaviest duty and constant use.

BUCYRUS-ERIE COMPANY
South Milwaukee, Wisconsin

BUCYRUS ERIE

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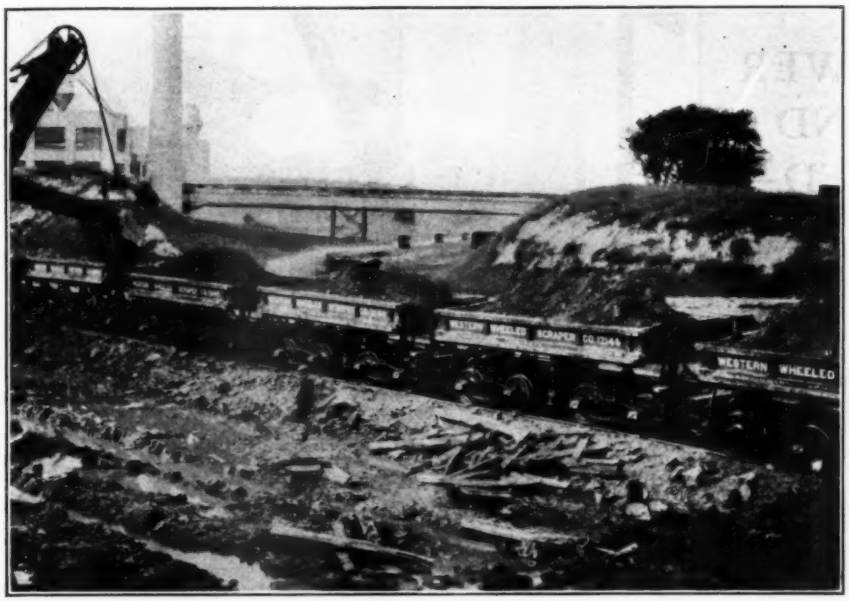


Western Dump Cars For Every Service

THERE are Dump Cars and dump cars, but the 12-yd. *Western* remains the most universally used dump car for work under a power shovel.

We build all types and sizes of dump cars to fit any job —

Wonderful Drop Door, Low Loading Westerns for heavy work or Lift door cars in all practical sizes.

All have that perfect adaption of mechanical design to economical performance for which Western Dump Cars are famous.

BUT, when standard gauge cars are needed for the average power job, the 12-yard size and the Western type, usually are installed.

Our Catalog 81-K discusses in detail the full line of Western Dump Cars. You should have it in your file. Tell us where to send it.

Western Wheeled Scraper Company

Pioneer Builders of Dump Cars

Aurora, Illinois, U. S. A.

WESTERN

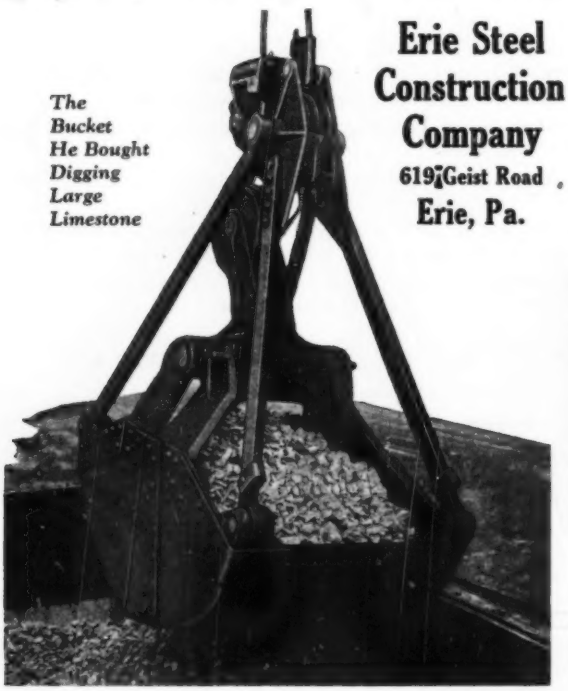
ERIE BUCKETS

POWER AND SPEED—

A contractor was buying a bucket
To use on a job in Nantucket.
He said, "Power and speed
Are the things that I need."
When he found this in the ERIE,
he "tuck it."

He "tuck it" because of its great speed in operation, its great closing power, and its all-steel construction; because it outdigs other buckets, and withstands the hardest usage; and because of its adaptability to the various types of cranes, derricks and hoists.

Shall We Send Catalog and Prices?



The Bucket He Bought Digging Large Limestone

Erie Steel Construction Company
619 Geist Road
Erie, Pa.

SHOTS FROM THE FIRING LINE — Continued

Wisconsin Notes (Continued)

Loading sturdy International dump trucks this Type 1035 Bucyrus-Erie is cutting closely to grade on street jobs in Kenosha for contractor **A. E. Bonnsall.**

North Dakota Notes

In the Benoit Pit near Crookston we found the above Bucyrus-Erie 50-B Diesel owned by the Great Northern Railway loading gravel for ballast on the Dakota Division. Before moving into this gravel pit the machine was used for bank widening in the vicinity of Hannaford, North Dakota.

St. Louis Notes

BY H. E. SNIPE

Here's the way **Batson Brothers** do it. These enterprising Ozark, Arkansas, contractors are using their Bucyrus-Erie 1030 to make the dirt fly on eight miles of Highway 64 they are grading between Ozark and Fort Smith. In most places the digging is in hard shale which must be dynamited.

English Prof: "Tell me one or two things about John Milton."

Fresh: "Well, he got married and he wrote Paradise Lost. Then his wife died and he wrote Paradise Regained."

CATERPILLAR
REG. U.S. PAT. OFF.

BETTER . . QUICKER . . CHEAPER

HERE'S modern equipment moving earth at the lowest cost per cubic yard — "Caterpillar" Tractors, "Caterpillar" Elevating Grader and modern wagons. Here's plenty of power to fight hard earth — here's plenty of traction to ignore light rains — here's dependability to banish the fear of a shut-down.

Prices— f. o. b. Peoria, Illinois

TEN	$1100
FIFTEEN	$1450
TWENTY	$1900
THIRTY	$2375
SIXTY	$4175

Caterpillar Tractor Co.

PEORIA, ILLINOIS, U. S. A.

Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

In writing to Caterpillar Tractor Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

St. Louis Notes

BY A. J. KOENIG

Paul T. Pfeifer of Rock Island, Illinois, subcontracting from the N. F. Smith Company on the Missouri State Highway project through the Ozarks, is keeping a fleet of trucks busy with his Bucyrus-Erie Gas + Air. This job is known as the relief highway for the Manchester Road and will cost approximately $200,000. The hill shown in the background of the illustration above, is one of the heaviest cuts and will require at least two months for its removal.

C. R. Cummins, Inc. of Cleveland was awarded contract for reconstructing and enlarging the Eldred Levee on the Illinois River. The project involves about 1,800,000 cubic yards of earthwork.

Martin Wunderlich Construction Co. of St. Paul was the low bidder on 22 highway construction projects at the last Missouri State Road letting. The projects entail approximately 1,000,000 cubic yards of excavation, and the total amount of their bids was $848,988. 477 bids on fifty sections were received at this letting.

The Illinois Central Railroad has asked the East St. Louis, Illinois, City Council to vacate certain streets and alleys in the vicinity of Fourteenth Street, and the Illinois Central Railroad tracks, in connection with the building of new yards.

G. E. Hoffman Construction Co. of Lincoln, Illinois, was awarded contract for constructing Route 48, Section 123, DeWitt County, Illinois, on their bid of $99,964.

W. C. Meneely Co. of Frankfort, Indiana, was low bidder on two sections of highway in St. Louis County-Ballas Road from Missouri Pacific tracks to Manchester Road, 22,170 feet, $146,857; and Ladue Road from Ballas to Denny Road, 10,841 feet, $79,010.

The United States Engineering Office at St. Louis will receive and open bids on December 3rd, for 10,000 lineal feet piling dikes on Missouri River at Bonhomme Bend.

In connection with the construction of the 2,500,000-bushel elevator at Kansas City, Missouri, the **Missouri Pacific Railroad** will build 8 miles of service tracks. Contract for the elevator will be let early in January, 1931.

W. A. Ross Construction Co., Kansas City, was low bidder for the construction of 10,650 lineal feet of standard pile clump dike and 9,040 lineal feet standard revetment at Jackass, Fishing River and Fire Creek bends on the Missouri River.

Williamson & Williams, Batesville, Arkansas, were awarded contract for 550,000 cubic yards of levee work in the Lower St. Francis Levee District on their bid of $0.2045 per cubic yard.

The Greater Kansas City Regional Plan Association has application before the War Department, Washington, for permission to build a bridge across the Kaw River. Frank A. Davis, Secretary, Commerce Building, Kansas City.

Kelly & Underwood, Granby, Missouri, were low bidders on four sections of 36-foot graded earth road on Highway No. 71, Newton County, Missouri. The project involves 12.72 miles of grading and seven bridges. Their bid was $176,755.

The Cincinnati Union Terminal Co. awarded contract for 4,000 feet of reinforced concrete bridge Central Parkway to McMillan Street, Cincinnati, to MacDougal Construction Co., Atlanta, Georgia, on their bid of $1,721,000.

Judge: "Now, James, I shall expect you to support your wife and twin babies faithfully from now on."

James: "But, Judge, you ain't heard all my side of the story. One of them twin babies ain't mine."

Plan Now to Start the Job with AsBESTos Blocks

Order Asbestos Blocks especially suited for your machine .... selected after painstaking experimentation in the field — on all types of work. Under every condition.

ASBESTOS

blocks and linings *take hold* — and hold, and hold — but they let go smoothly at your command. No after catches — no jerky starts. Write for prices, specifying your needs.

BUCYRUS-ERIE COMPANY

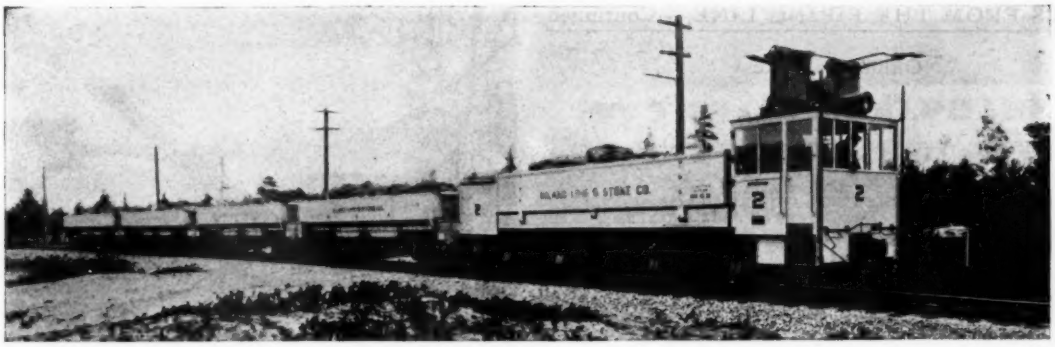
BUCYRUS ERIE

Specialty Department
South Milwaukee, Wisconsin

Buckeye

TRENCH EXCAVATORS AND BACKFILLER-CRANES

The Buckeye Traction Ditcher Co.
Findlay, Ohio



Differential Locomotive, electric drive, with a 50-ton useful load on the locomotive. Designed and constructed to stand severe loading conditions.

DIFFERENTIAL LOCOMOTIVES

The Modern Haulage System

The Differential Locomotive consists of a self-propelled chassis on which a dump body is carried. The Differential principle results in savings in every phase of operation. One additional load per trip is gained with same length of train. Extra tractive effort is available when needed. Differential Locomotives are propelled electrically; or by self-contained power plants as follows: gas-electric, Diesel-electric, or gas mechanical.

Differential Waste Disposal Train extending dump in all directions without trestling and with a minimum amount of labor.

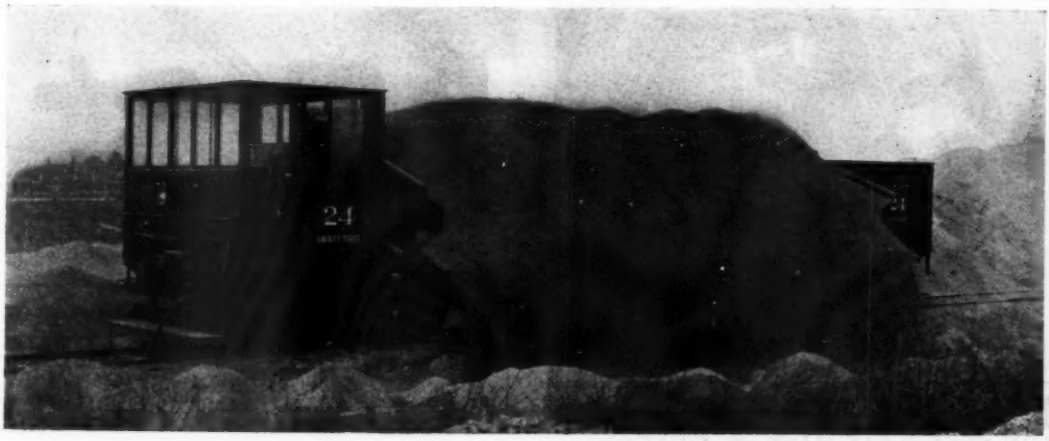
Differential Waste Disposal Train consisting of Locomotive and 3-way dumping trailer, each having a level load capacity of ten cubic yards.

Differential equipment offers an economical solution to your haulage problem. Differential Locomotives in various sizes and types, air dump cars in various sizes, dump bodies for crawler type wagons, and dump cars of various sizes for use with dumping devices are included in our line of haulage equipment.

"Carry a Load on the Locomotive"

THE DIFFERENTIAL STEEL CAR CO.

FINDLAY, OHIO



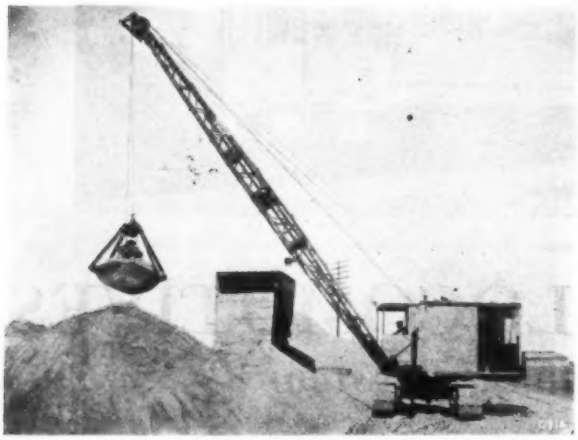
Differential Locomotive, gasoline driven, dumping load. May be profitably employed in stock-piling stone, coal, or ore, and in the disposal of waste and stripping for quarries, mines, industrial plants, etc.

In writing to The Differential Steel Car Co. please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Oklahoma Notes

BY C. F. BARTON



Handling sand and gravel for the **Porter Construction Company of Tulsa, Oklahoma,** is the principal job of the above Bucyrus-Erie 1035. With its Owen clamshell it swings an average of 600 yards per nine-hour shift from car to stock pile and stock pile to bin. Three gallons of gasoline per hour are needed to feed its powerful Waukesha engine, and it takes seven gallons of oil a week to keep it good natured.

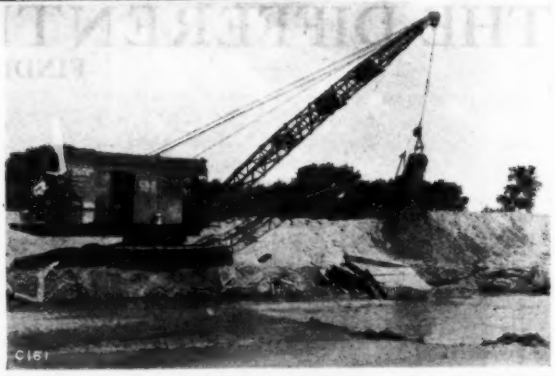
Dan Blackburn & Sons, Claremore, excavating contractors, are busily grading Highway No. 11 in Rogers and Mayes Counties. They have two 1030 ¾-yard Bucyrus-Erie shovels on this job working two ten-hour shifts. One of them is

shown above. Bill Blackburn is actively in charge of the work and is certainly keeping things moving. Mr. Blackburn is enthusiastic about the Type 1030 shovel and the company have just recently purchased their second machine.

Southwestern Notes

BY H. E. PADGETT

Here are Operators Goolsby and Brown and one of the Bucyrus-Erie 50-B Diesels with which they are digging drainage canals and piling up levees in the **Middle Rio Grande Conservancy District** near Belen, New Mexico. The lower view shows Operator Robinson building a Rio Grande levee near Albuquerque with another of the four Bucyrus-Erie Diesel draglines working in this district. The special long cats on which these machines are mounted take them easily through the soft going. Note the fuel pump on the running board, and the handy extension platform on the back where fuel and lubricating oil for the Atlas Diesel engine are carried. There are Kohler light plants on the machines for night work.



EASTON CARS
FOR EVERY PIT, MINE AND QUARRY
Easton Car and Construction Company
Easton, Penna.

MEETING PLACE OF CAPITAL AND LABOR
THE KOENIG LABOR AGENCIES
Established 1875
ST. LOUIS
612 Walnut Street
Main 2766 and 2767
KANSAS CITY
501 Delaware Street
Main 0796
HELP OF ALL KINDS FURNISHED FREE

SHOTS FROM THE FIRING LINE — Continued

Southern Notes

BY R. S. WELFER

The Spartanburg Contracting Company of Spartanburg, South Carolina, recently placed a new Bucyrus-Erie Gas + Air shovel on work awarded at a previous letting.

E. F. Powers Construction Company of Tunica, Mississippi, and West Palm Beach, Florida, is making good progress on their levee job. They are working under the Vicksburg United States Engineer's Office of the Mississippi River Commission, using a Bucyrus-Erie electric tower excavator. They also have a motorized hauling unit. Mr. Powers called at our office recently and stated that the tower machine had handled 9,600 cubic yards in twenty-four hours.

Pacific Coast Notes

Here **Frederickson & Watson** begin work of making a fill to widen the roadway to U. S. Highway 99 between Stockton and Sacramento. When completed, the roadway will be 36 feet wide, 20 feet of it concrete, with provision for an ultimate width of 56 feet. Frederickson & Watson used two Caterpillar Sixtys, an Ateco Dirtmover, Northwest shovel, Caterpillar Super-Mogul Grader, Killefer Scarifier and some trucks.

Bowman Brothers, Excavating Contractors, at their new location, 847 North Fairfax Avenue, recently announced the

On the waste dump and in the quarry of the world's largest producer of limestone, these two Track Machines have replaced the large track gang formerly used for shifting and raising track. On any shifting and raising job, this machine soon pays for itself out of labor savings.

Write for Bulletin GR-8.

NORDBERG MFG. CO., Milwaukee, Wis.

THE NORDBERG PATENTED TRACK MACHINE

IN THE OWEN ALPHABET "S" MEANS SWIFTER OUTPUT

Count on these large, wide-spreading Owen Type "S" Rehandlers to make fast time on the job. And how! A full Owen-sized load every time . . . overloads where the material is deep . . . quick, clean dumping . . . nothing left for clean-up. A Bigger Day's Work—yes sir, that's under guarantee.

THE OWEN BUCKET CO.

6026 Breakwater Ave., Cleveland, Ohio

SHOTS FROM THE FIRING LINE — Continued

addition of a complete automotive super-service with Standard Oil products.

Larsen Bros., and **T. M. Morgan** also worked on this project and used Ateco Dirtmovers and Caterpillar tractors with other equipment.

D. McDonald, Sacramento contractor, is also working on U. S. Highway 99. He is building an approach fill to a new bridge across the Mokelumne River near Lodi. About 50,000 cubic yards of material are going into the fill. Mr. McDonald is using six Autocars, two P. & H. draglines, Caterpillar Sixty, Caterpillar Thirty, Ateco Dirtmover, Ateco Bulldozer and Ateco Tamping Roller.

The J. Catucci Company of Oakland, California, has recently completed the excavation for the new I. Magnin Store, located at 20th and Broadway, Oakland. The accompanying illustrations show this company's two Bucyrus-Erie Gas + Air shovels; in the lower picture one of these machines is

removing the top of a hill for an Oakland homesite; the other shows the Magnin Store job. Beside these two Gas + Air shovels, Mr. Catucci owns Bucyrus-Erie Type 1030 and Type "B" shovels. Note in the upper picture the neat tool box on a trailer parked on the street at the left. Also how Mr. Catucci uses his equipment effectively to carry his advertising. The sign on the back of the Mack truck in the lower view brings many an extra dollar for dirt from his excavating operations. This Mack, by the way, should be able to travel anywhere with its extra and dual wheels in the rear.

Wire Rope
Rope Sockets
Rope Clips
Hoisting Chain
Injectors
Brake Linings
Wood Blocks
Asbestos Fabric
Asbestos Blocks
Fire Box Arches
Fuel Hoists
Dipper Trips
Steam Fans
Rail Clamps
Rail Chairs
Rails
Bridles
Suction Hose
Oil Pumps
Drain Valves
Jacks
Portable Electric Blowers
(for cleaning electrical machinery)
Hand Hoists
Asbestos Packings
Flexible Metallic Packings
Moulded Metallic Packings
Oil Burning Equipment
Power Transmission Cable
Dragline Rollers

BUCYRUS ERIE

BUCYRUS-ERIE COMPANY
Specialty Department
South Milwaukee, Wisconsin

VITALLY interested in the successful performance of machines bearing their name, Bucyrus-Erie Company offers a complete line of carefully selected tested accessories and supplies that will give you the best service in keeping your machines operating day after day, month after month, and year after year.

Bulletins on any of the items listed here will be sent on request.

In writing to Bucyrus-Erie Company please use post card bound in the center of this number.

SHOTS FROM THE FIRING LINE — Continued

Von Der Hellen & Pierson are at work on the first section of the new Alternate Ridge Route which is to cut seven miles off the old Ridge Route that links Southern California to the Northern part of the State. The State hopes to have the entire Alternate Route, consisting of 28.5 miles through Tehachapis completed within the next few years. The project involves the moving of between 3,000,000 and 4,000,000 cubic yards of material. The total cost, including pavement, will amount to approximately $3,400,000. The new Alternate Route will be a broad roadway of sweeping curves as shown in the illustration. Instead of the present 25 feet width, it will be 36 feet wide. The curves will have a minimum radius of 1000 feet.

The Von Der Hellen & Pierson contract extends from Castaic, seven miles north. They are obtaining material for the fills by blasting on the line of the proposed route. The material is moved by Lorain shovels and Autocar trucks to the fills, where Caterpillars with Ateco bulldozers spread it in 8-inch layers, in accordance with the State Highway specifications. Ateco Dirtmovers and "Caterpillar" tractors put the finishing touches on the grade and smooth hillsides along roadway.

New Sales and Service Facilities for Gredag Lubricants

ON November 1, 1930, the sales and service facilities for Gredag Lubricants, well-known and long-established products of the Acheson Graphite Corporation — a Unit of Union Carbide and Carbon Corporation — were greatly extended.

Gredag Lubricants are now being sold and distributed by the Carbon Sales Division of National Carbon Company, Inc., — a technical organization which for many years has been in constant contact with industrial plants and distributors of industrial products.

The addition of Gredag Lubricants to the products of the Carbon Sales Division will bring into the lubrication field a force of competent sales engineers familiar with industrial problems. It will also add to previous facilities five conveniently located Sales Offices and Service Plants.

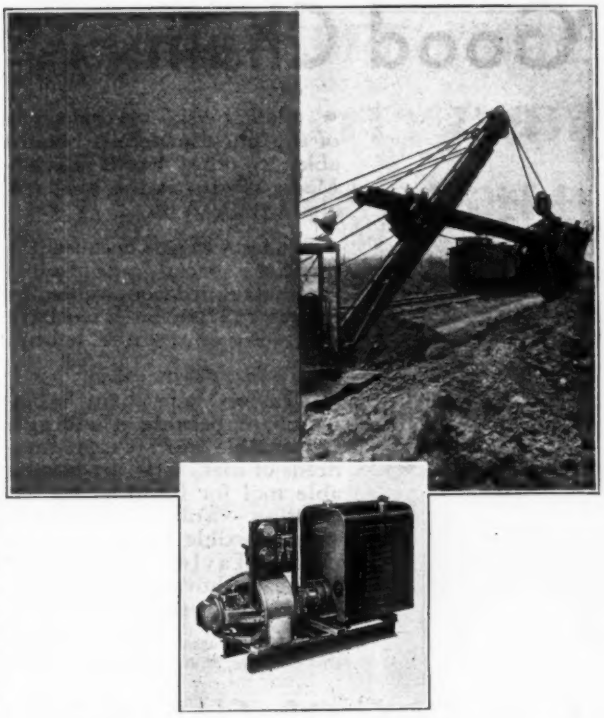
Please address your inquiries and orders for Gredag Lubricants to the nearest Branch Office of the Carbon Sales Division.

NATIONAL CARBON COMPANY, INC.

Carbon Sales Division: Cleveland, Ohio

Unit of Union Carbide UCC *and Carbon Corporation*

Branch Sales Offices: New York, N. Y. Pittsburgh, Pa. Chicago, Ill. San Francisco, Calif.



Stand Back, Night

Why let night rob you of hours when you need these hours most. Why let expensive construction equipment stand idle, running up your costs, when two or three shifts per day could make that equipment really profitable.

With the Novo Flud-Lite Lighting Unit, you can say: "Stand back, night—and let me work". You get almost daylight lighting for cranes, shovels, dredges and construction work of all kinds—at a cost of only a few cents per hour.

Compact—Fool-Proof

The Novo Flud-Lite Lighting Unit consists of a standard generator directly connected to a standard 1, 2 or 4 cylinder Novo anti-friction engine, with Timken Roller Bearings on crankshaft and drive shaft.

Lights are standard 110 volt. You can buy them at practically any electrical supply house.

And the Units are built in sizes ranging from 1¼ to 25 KW—to fit virtually any construction job. Write for complete details.

NOVO ENGINE COMPANY

222 Porter Street, Lansing, Michigan

Clarence E. Bement, Vice-Pres. and Gen. Mgr.

Sold and Serviced by National Supply Co.

NOVO Flud-Lite Lighting Units

Good Chain

● made by skillful craftsmen of the finest materials obtainable, in other words Taylor-Made Chain, is the cheapest chain you can buy.

● It lasts longer because it is made of a special grade of triple rerolled refined iron, welded by master craftsmen who have years of experience behind them.

● Taylor-Made chain is better chain because it will give dependable service in hundreds of uses. It is an invaluable tool for hoisting, for excavating—and wherever a strong flexible joining force is needed. Taylor Mesaba chain for steam shovels has been the standard for years.

● Write for catalog "A". You'll find this book of chain data very useful.

S. G. TAYLOR CHAIN CO.
P. O. Box 1297-B HAMMOND, IND.

IN A SCRAPER OUTFIT
THE SCRAPER IS THE
IMPORTANT UNIT
Garst POWER PLOW SCRAPER
Heavy clay or loose sand—the GARST POWER SCRAPER works equally well.... It is the only scraper with an adjustable top. This allows a variation of approximately 40% of its normal capacity. It forces no harmful overload on the hoist—yet it always has leeway for the bigger load. ... The GARST POWER PLOW SCRAPER is an all-purpose scraper. It is the result of many years of experiments and is based on the plow principle that is 4000 years old. ... There are innumerable ways in which GARST POWER PLOW SCRAPERS will cut your excavating costs.
THE GARST MANUFACTURING COMPANY
549 West Randolph Street, Chicago, Illinois

Saluda Project Rivals Muscle Shoals

(Continued from page 587.)

excavation of the cofferdam begun. A considerable quantity of rock had to be blasted to get the excavation down to the required grade before the pouring of concrete could begin.

A substation was built nearby. Here the output from the big generators of the power station is to be controlled and its voltage raised for transmission over long distances with minimum loss.

More Power Than at Present Possible at Muscle Shoals

From the immense storage capacity of the lake, the power station will be able to generate sufficient electrical energy to supply 235 mills with 500 horsepower each for 10 hours a day and six days a week over a period of six months of complete drought.

Under comparable conditions of rainfall the development will yield a greater amount of twenty-four-hour power than is at present possible at Muscle Shoals. The development when completed will give South Carolina one of the largest and most dependable sources of hydro-electric power supply in the world.

Work on the construction of the earth fill for the dam and its structures was started on September 17, 1927, and completed on July 1, 1930.

The organizations in the field and their representatives were: W. S. Barstow & Co., Inc., Contractors—N. D. Urquhart, Construction Engineer; Murray & Flood, Engineers—Arthur R. Wellwood, Resident Engineer; Albert S. Crane, Consulting Engineer, New York City; The Arundel Corporation, Baltimore, Maryland, Howard R. Firor, General Superintendent.

New Sea Wall Guards Chicago Drive

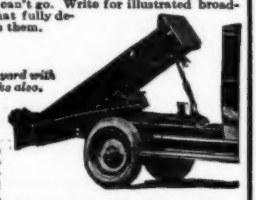
(Continued from page 576.)

The Gerlach Company to handle the stone from trucks to place. Twelve Macks keep a steady supply coming in from the railroad siding about

Put An "IRON MULE" on the Job

It Licks Trucks and Teams

"IRON MULES" for years have made phenomenal profits for dirt-moving contractors. There are 2 sizes—the 4-yard with power hoist dump and crawler tracks, and the 2-yard with gravity dump. These sensational dirt haulers will get where trucks and teams can't go. Write for illustrated broadside that fully describes them.



Dump Bodies Too

HUGHES-KEENAN Dump Bodies for all makes of light trucks are famous wherever dump bodies are used. Made in 1 and 1½ yard sizes, equipped with gravity dump, underbody hand hoist or power hoist. Write for descriptive folder.

THE HUGHES-KEENAN CO. Mansfield, Ohio

2 to 3 miles away, where the stone is unloaded by a Bucyrus-Erie Type B steam crane. With this set up of equipment the wall is going into place at the rate of 1,000 tons per eight-hour day.

Frank Lynch is operating the Gas + Air, while "Smokie" Henwood is handling the steamer.

Work to Be Completed in Record Time

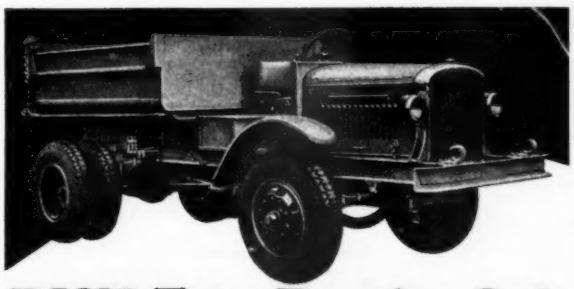
At this writing (October 17th) approximately 30,000 tons of stone have been placed, and it is expected that the entire contract will be completed by December 1, 1930.

While the quarry hooks used to handle the stone are a close relative to the iceman's tongs and the logger's loading tongs, perhaps they will interest some of our readers. They are heavy crescent hooks slung in the bight of a chain. Small depressions are dug into the side of the stone, the points of the hooks inserted, slack taken up, the hooks bite into the nicks and away goes the big stone. As soon as the stone is in place and slack given the lifting line, the hooks release readily.

Max Gerlach is in charge for The Gerlach Company.

John M. Egan is Chief Engineer for the Lincoln Park Board.

B. G. Gremley, Assistant Chief Engineer, is in direct charge of the job for the Lincoln Park Board.



BUILT to Do the Job

THE Hug Roadbuilder does everything a Roadbuilder truck is expected to do. No matter where the job, what operating conditions might be, how tough the problem—the Hug performs the work it is designed to do—builds roads efficiently with low operating cost. That's why it's the popular choice of roadbuilders and contractors.

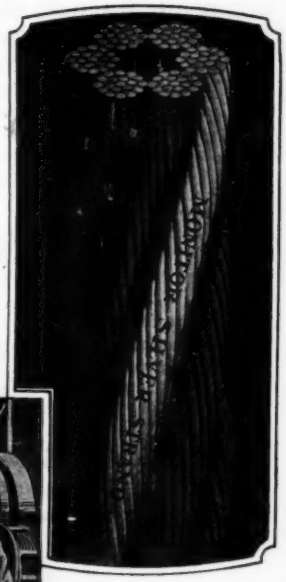
Hug Roadbuilder Trucks will be exhibited at the A.R.B.A. Road Show in Saint Louis, January 12 to 16, space B-35. You are cordially invited to inspect the latest models of modern Roadbuilding Transportation Units.

HUG

THE HUG CO., Highland, Illinois

THE MEASURE of WIRE-ROPE QUALITY IS THE SERVICE IT HAS RENDERED

Which wire rope to use on your equipment—which brand will give the longest and most economical service—may be best determined by past records of performance established under similar operating conditions. This and the reputation of the maker are of paramount importance.



FOR over half a century American Wire Rope, made exclusively by the American Steel & Wire Company, has demonstrated its superiority—proved beyond question that its tough, flexible and abrasion-resistant nature is the best insurance against breakdowns and costly delays.

Regardless of your particular problem, you will find an American Wire Rope exactly adapted to its economical solution. Consult our nearest branch office or distributor to get the right rope for your purpose.

AMERICAN STEEL & WIRE COMPANY WIRE ROPE

AMERICAN STEEL & WIRE COMPANY

SUBSIDIARY UNITED STATES STEEL CORPORATION

208 S. LaSalle St., Chicago 30 Church St., New York

Other Sales Offices: Atlanta Baltimore Birmingham Boston Buffalo Cincinnati Cleveland Dallas Denver Detroit Kansas City Memphis Milwaukee Minneapolis-St. Paul Oklahoma City Philadelphia Pittsburgh Salt Lake City St. Louis Wilkes-Barre Worcester

Pacific Coast Distributors — Columbia Steel Company: San Francisco, Los Angeles, Portland, Seattle, Honolulu.

Export Distributors: United States Steel Products Co., 30 Church St., New York City.

When you install a "Loomis Clipper" drill, you have a machine designed to meet any change of requirements. The "Clipper" steel frame is interchangeable for—

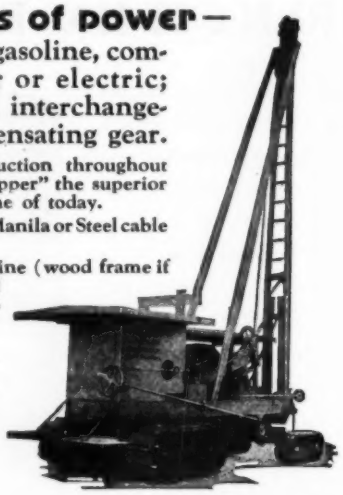
all types of power—

for steam, gasoline, compressed air or electric; with steel interchangeable compensating gear.

Rugged construction throughout makes the "Clipper" the superior drilling machine of today.

Furnished for Manila or Steel cable drilling.

All Steel machine (wood frame if desired) round wheel or crawler mounted.



Write for full information—no obligation.

THE LOOMIS MACHINE COMPANY

(Established 1842)

K Street, TIFFIN, OHIO

INTEREST PAYABLE—The use of a Hayward Bucket pays interest regularly in the form of lower excavating costs. Address The Hayward Co., 52-54 Church St., New York, N. Y.
Hayward Buckets

POSITIONS WANTED

Space under this heading is available at $5.50 per inch or fraction thereof.

Address all box numbers % The Excavating Engineer at South Milwaukee, Wisconsin

Shovel Operator

20 years' experience on Bucyrus-Erie steam machines. Have shop, erecting and operating experience. Willing to go anywhere in United States. Can take complete care of machine. First-class references available. Present location, Arkansas. Box 3201.

Master Mechanic

5 years' service engineer with shovel manufacturer, 3 years shovel operator, thoroughly experienced mechanic, familiar with gas, electric, steam and Diesel power plants, open for position as Master Mechanic in excavating work. Can furnish good references. Fully competent to instruct and supervise operators in care and operation of machines. Will go anywhere. Write Box 3202.

Shovel and Dragline Operator

13 years' experience in grading, building excavation and gravel pits on shovels and draglines. Sober, industrious. 32 years of age, single, ready to go anywhere except Tropics. Can do own repair work and can give excellent references. Write Box 3203.

Clamshell—Shovel Operator

21 years' experience on highway grading, cellar excavation and loading shale in brick works. Prefer operating Bucyrus-Erie Type B machine anywhere in the United States. Can do all repair work and furnish excellent references. Present location, New York. Box 3204.

Dragline—Clamshell—Shovel Operator

12 years' experience on Bucyrus-Erie machines: steam—5 years, electric—5 years, Diesel—2 years, on all types of excavation. Prefer operating any Bucyrus-Erie machine in strip mines. Will go anywhere in the Middle West. Can do own repair work and furnish first-class references. Present location, Montana. Box 3205.

Clamshell—Shovel Operator

22 years' experience as follows: 18 years—steam, 2 years—gas, 2 years—Gas + Air, on road work, sewer and cellar excavation and rock digging. Prefer operating Gas + Air machine anywhere in United States. Married. Can furnish reliable references and can do own repair work. Present location, Pennsylvania. Box 3206.

Clamshell Operator

13 years' experience on highway excavation, paving and bridge work, on gasoline powered machines. Prefer southern location, but will go anywhere in Central States. Can do own repair work and furnish reliable references. Present location, Texas. Box 3210.

Dragline Operator

11 years' experience on steam and Diesel machines. Excellent repair man. Would prefer operating a Bucyrus-Erie 50-B anywhere. Can furnish reliable references. Present location, New York. Box 3211.

Shovel Operator

Experienced on steam machines on highway grading and general excavation, also 4 years as construction superintendent. Willing to go anywhere in United States. Married. Can do own repairing, and can furnish first-class references. Present location, Alabama. Box 3212.

Foreman—Operator—Superintendent

32 years' experience in general excavating and mining. Can operate any make of machine. Willing to go anywhere in United States. Can do own repairing and furnish reliable references. Present location, Illinois. Box 3213.

Shovel Operator

15 years' experience on steam machines on general excavation work. Prefer operating Type B Erie anywhere in United States. Can do all repair work and furnish reliable references. Present location, New Hampshire. Box 3207.

Shovel Operator

12 years' experience on steam and gas-powered machines on highway construction work. Prefer operating steam or gas machine anywhere in the United States. Married. Can do own repair work and furnish first-class references. Present location, Pennsylvania. Box 3208.

Steam Shovel Operator

Six years' experience on steam machines. Can run any type of machine. Willing to go anywhere. Will accept fireman or craneman job. Present location Illinois. Box 3209.

TRADE NOTES

The Patents Holding Corporation, of Frederick, Maryland, has granted a license to the Caterpillar Tractor Company, Minneapolis, Minnesota, to manufacture power-propelled road graders and maintainers under patents controlled by Patents Holding Corporation.

A. F. Deaney, Indianapolis, has been appointed distributor for Southern Indiana, and **Stockberger Equipment Company,** Fort Wayne, distributor for Northern Indiana by the **G. H. Williams Company,** builder of the Williams "Champion" series of buckets for all classes of excavating and rehandling, and the Williams "Arch-Girder" heavy-duty trailer.

On November 1st the Columbus and Cleveland, Ohio, sales divisions of **The Lakewood Engineering Company** were combined under one roof at 520 Dublin Avenue, Columbus.

Mrs. Henpeck (sarcastically): "I suppose you've been to see a sick friend — holding his hand all evening."

Mr. Henpeck: "If I'd been holding his hand, I'd have made some money."

BOOK REVIEWS

Publication of a 38-page booklet "Mine Foremanship"— a compilation of seventeen lectures on the essential qualities necessary in successful foremanship — is announced by the **Hercules Powder Company.** Authorized by Dr. J. J. Rutledge, Chief Mine Engineer, Maryland Bureau of Mines, these articles appeared successively as a monthly study series in The Explosives Engineer magazine, published by the Hercules Powder Company.

Each of the personal attributes which effect leadership is treated separately in an interesting and vigorous manner, comprising a series of seventeen lectures. Foremen, superintendents, engineers, executives, and those who are interested in developing latent qualities of leadership, will find this booklet useful as a guide. The booklet is attractively illustrated. It can be secured free of cost by writing to the Hercules Powder Company, Wilmington, Delaware. Please mention this magazine.

FOR SALE

Space under this heading is available at the following rates, payable in advance of publication:

1 to 3 inches.....$5.50 an inch net
4 to 7 inches..... 5.25 an inch net
8 to 14 inches..... 5.00 an inch net

An inch is measured vertically on one column — three columns to a page. Any space may be used measured by the even inch in height and by one, two or three columns in width.

The price per inch is based on total space used — multiply ad space by number of continuous insertions.

Address all box numbers c/o The Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 yards

MARION ELECTRIC SHOVEL, Model No. 36. **MARION STEAM SHOVEL,** Model No. 36. Location Central Ohio. Box 1204-A.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, equipped with 21-foot boom, 18-foot dipper handle, boom hoist, ¾-cubic-yard dipper; sold new 1924; just completely overhauled; price reasonable; located vicinity of Chicago. Box 41-SS.

NORTHWEST SHOVEL, model 105, caterpillar mounted. 24-foot boom, 1-cubic-yard dipper, 16-foot dipper handle. In good condition. Price $4,500, f. o. b. Utica, New York. Box 34-SS.

RECONDITIONED TYPE B ERIE HIGH LIFT SHOVEL, shop number 3175, mounted on spur gear caterpillars, equipped with 19-foot 9-inch boom, 16-foot dipper handle, ¾-cubic-yard dipper, boom hoist, two-speed travel mechanism. Box 87-SS.

MODEL No. 21 MARION STEAM SHOVEL, high lift boom and forward drum, in excellent condition, boiler just retubed, location Baltimore. Price $5,000.00. Address Box 1101.

RECONDITIONED TYPE-A ERIE STEAM SHOVEL on caterpillars, ⅝-cubic-yard dipper, 16-foot boom, 13-foot dipper handle, boom hoist, Massachusetts boiler. Machine thoroughly inspected, worn parts replaced. Guaranteed to be in first-class operating condition. Will rent or sell. Box 37-SS.

ONE NORTHWEST SHOVEL, 28-foot boom, 16-foot dipper handle, 1¼-cubic-yard bucket, 90 h.p. Twin City motor, new caterpillar, new boom, open cab, purchased late 1925, machine in good working condition and can be demonstrated at any time —price around $5,000. Box 113-SS.

ONE P. & H.-204 ½-CUBIC-YARD COMBINATION GAS SHOVEL AND CLAMSHELL, shop number about 2220. New 35-foot clamshell boom, and ½-cubic-yard Owens Bucket. Machine is in good condition and has had the best of care. Can be inspected in operation in Milwaukee. Priced to sell quickly. Box 99-SS.

MARION MODEL 37 ELECTRIC SHOVEL suitable for 3-phase, 60-cycle, 440 volts, equipped with 32-foot boom, 22-foot handles, and 1½-cubic-yard dipper, on caterpillar mounting. Machine in very good condition. Located near Pittsburg, Kansas. Price reasonable. Box 90-SS.

BUCYRUS-ERIE GAS + AIR SHOVEL, shop number approximately 9800, equipped with 22-foot 6-inch boom, 16-foot dipper handle, one-cubic-yard inserted tooth dipper, power boom hoist. Mounted on single shaft caterpillar-type mounting. Has moved only 40,000 yards of material. Located vicinity of Poughkeepsie, New York. Box 96-SS.

REBUILT GA-2 ERIE SHOVEL mounted on new single shaft caterpillar, 1-cubic-yard inserted tooth dipper, 22-foot 6-inch boom, 16-foot dipper handle, starter. Carries guarantee of new machine. Box 43-SS.

TYPE "A" ERIE STEAM SHOVEL, shop number about 1900, caterpillar mounted, 16-foot boom, 14-foot dipper handle, ⅝-cubic-yard dipper, boom hoist. In first-class condition. Located Chicago vicinity. Priced to sell. Box 69-SS.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, equipped with 21-foot 3-inch boom, 18-foot 6-inch dipper handle, power boom hoist, ¾-cubic-yard dipper; in excellent condition; just installed $400 worth of repairs. Located vicinity Kansas City. Box 80-SS.

NORTHWEST DRAGLINE, Model 105, shop number in 2000's; 45-foot boom, fairlead and no bucket. In good condition. $3000.00. For further particulars address communications to Box 114-SS.

OSGOOD GASOLINE DRAGLINE, 1¼-cubic-yard bucket. 22-foot boom, 16-foot dipper handle, manganese front dipper, 4-cylinder Le Roi motor, 125 h.p., 45-foot boom, fairlead, no bucket. $6000. For further particulars address communications to Box 115-SS.

P. & H. SHOVEL, Model 600, 21-foot boom, 14-foot dipper handle, 1-cubic-yard bucket, on caterpillars, purchased November 1928, shop number 2989—machine is now being thoroughly overhauled and can be demonstrated in about a week. Box 116-SS.

TWO TYPE "B" ERIE STEAM MACHINES, mounted on "cats," ¾-cubic-yard dippers, shop numbers 2300 and 2301, 19-foot booms and 16-foot dipper handles. Box 83-SS.

31-B STEAM SHOVEL, Number 4880, in very good condition; priced right; located Pittsburgh, Pennsylvania. Box 128-SS.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE D-2 DIESEL DRAGLINE, 45-foot boom. Also 1-yard dragline bucket and Delco Lighting plant. Would rent for long period with option of purchase. Located Southern Indiana. Box 130-SS.

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RECONDITIONED TYPE-B SHOVEL, number 3175, spur gear caterpillar-mounted, 19-foot 9-inch boom, 16-foot dipper handle, ¾-yard dipper, power boom hoist. Located Detroit. Price right. Box 132-SS.

REBUILT BUCYRUS-ERIE TYPE B-2 SHOVEL, shop number about 4000, spur gear caterpillar-mounted, 19-foot 9-inch boom, 16-foot dipper handle, ⅞-cubic-yard inserted tooth dipper and power boom hoist. Fully guaranteed. Box 133-SS.

SLIGHTLY USED, RECONDITIONED AND GUARANTEED BUCYRUS-ERIE 1030 SHOVEL, gasoline rope crowd, extra high lift, with 40-foot boom, clamshell and dragline equipment, also drag shovel equipment. Excellent condition. Price right. Located Western Pennsylvania. Box 134-SS.

USED NORTHWEST SHOVEL, 24-foot boom, 15-foot dipper handle, 1-cubic-yard dipper, equipped with 4-cylinder, 6¼ in. x 8¼ in., Atlas Diesel Engine. Good operating condition. Located San Francisco. Price right. Box 135-SS.

MARION TYPE 32 COMBINATION DRAGLINE AND SHOVEL, shop number 5683, dragline boom 50 feet, one-cubic-yard drag bucket included. Shovel boom 24 feet, dipper handle 17 feet 6 inches. Manganese front dipper 1¼ cubic yards. Machine purchased new October 1926, original cost $17,500. Will sacrifice and offer terms to reliable party. Located in vicinity of San Antonio, Texas. First-class condition. Address Box 1004-A.

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Under 2 Yards
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ONE P. & H.-400 ¾-CUBIC-YARD GAS SHOVEL—shop number about 3650, equipped with oversize motor and reinforced boom. Machine is one year old, and has seen very little service. Located in Southern Wisconsin. Box 98-SS.

MARION MODEL 22, shop No. 5459, mounted on "cats," steam-powered, 1¼-cubic-yard dipper, 24-foot boom, 17-foot 6-inch dipper handles. Box 82-SS.

TYPE "B" ERIE STEAM SHOVEL, caterpillar mounted, 19-foot 8-inch boom, 16-foot dipper handle, ¾-cubic-yard dipper, power boom hoist. In good condition. Located Northern Indiana. Box 81-SS.

RECONDITIONED TYPE B SHOVEL, shop number approximately 3100, caterpillar mounted, ¾-cubic-yard inserted tooth dipper, 19-foot 9-inch boom, 16-foot 4-inch dipper handle, power boom hoist. Guaranteed. Will rent with option to purchase. Price on application. Box 40-SS.

TYPE "A" ERIE STEAM CLAMSHELL MACHINE, mounted on traction wheels, equipped with 26-foot boom; to operate ½-yard bucket; shipped new 1921. Located southern Iowa. Priced very reasonable. Box 31-SS.

MODEL 20-B BUCYRUS GASOLINE SHOVEL AND CLAMSHELL MACHINE, shop number in 4800 series; mounted on full caterpillar; equipped with high lift gooseneck shovel boom and ⅞-cubic-yard dipper, also 36-foot clamshell boom and ¾-cubic-yard clamshell bucket. Machine in good working condition. May be inspected at Omaha. Reasonably priced. Convenient terms may be arranged. Box 55-SS.

BUCYRUS 30-B STEAM MACHINE, shop number 3578. Has seen approximately eight years' service. Equipped with new boom and boiler. Reasonably priced. Located New York State. Box 72-SS.

MARION MODEL 7 ONE-YARD STEAM SHOVEL. Shop number around 6000. Good condition. Price $5,000. Box 101-SS.

ORTON SHOVEL, new 1928. 16-foot 4-inch boom, 12-foot dipper handle. ⅝-cubic-yard dipper. Inquire Clyde Equipment Company, Seattle, Washington. Box 100-SS.

TYPE "B" ERIE HIGH-LIFT SHOVEL. Shop number about 1115. 19-foot 6-inch boom, 16-foot dipper handle, ¾-cubic-yard bucket, Caterpillar mounted. In good operating condition. Cheap. Location Central Illinois. Box 104-SS.

ONE 18-B BUCYRUS, ⅞-yard dipper on full revolving caterpillars. Box 505-A.

OSGOOD HEAVY-DUTY, GASOLINE-DRIVEN, 1-YARD COMBINATION DRAGLINE-CLAMSHELL MACHINE, on cats equipped with 40-foot boom, 6-cylinder Beaver motor, starter and lighting plant operating from generator. Machine 2 years old. Located Central Illinois. Priced to sell. Address Box 1106.

TYPE "B" ERIE STEAM SHOVEL, shop number 2019, mounted on new caterpillar type traction purchased late, spring of 1929. Equipped with new 19-foot 9-inch boom, 16-foot dipper handle and ¾-cubic-yard dipper. First-class condition. Price $8,750 F. O. B. Louisville, Kentucky. Box 12-SS.

OSGOOD STEAM SHOVEL, 1¼-cubic-yard dipper, caterpillar mounted. Shop number 1397, priced f. o. b. cars, Summittville, Tennessee. Box 86-SS.

ERIE TYPE "GA-2" GAS + AIR SHOVEL, shop number 4117, mounted on spur gear drive caterpillar trucks, and equipped with a 24-foot boom; 18-foot, 4-inch dipper handle; 1-cubic-yard manganese cast front socket inserted tooth dipper; power boom hoist; air self-starter, and all equipment and appurtenances in accordance with the specifications of the Bucyrus-Erie Company, f.o.b. cars shipping point Virginia. Box 126-SS.

UNIT ½-CUBIC-YARD GAS SHOVEL, full revolving. New June 1930. In excellent condition throughout and priced exceptionally low. Located in Northern Wisconsin. Box 127-SS.

NORTHWEST 105, 1-cubic-yard gas shovel, shop number about 1820. In good working order. Can be inspected in operation vicinity of Milwaukee. Priced to sell. Box 119-SS.

MODEL 700 P. & H. 1¼-cubic-yard gas shovel, shop number 3101, chain crowd, 21-foot 7-inch boom, 16-foot dipper stick, purchased May 1928, price about $6,000. Located near Schoharie, N. Y. Box 117-SS.

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MODEL 206 P. & H. DRAGLINE, caterpillar-type mounting, 38-foot boom and 5-foot extension. Recently overhauled and new Waukesha engine installed. Can be inspected in operation in Omaha, Neb. Box 79-SD.

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MODEL 206 P. & H. DRAGLINE (shop number about 1760), equipped with 45-foot boom, 1-yard drag bucket, including about $200 worth of repairs; located vicinity of Indianapolis. Priced to sell quick. Address Box 601.

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BYERS GASOLINE ONE-HALF SWING, 30-FOOT BOOM CLAMSHELL EXCAVATOR, including ½-cubic-yard Williams clamshell bucket and trench hoe equipment, powered with Hercules motor. Machine about 4½ years old. Price complete, machine f. o. b. present location vicinity Buffalo, New York, $2,500.00. Box 66-SCC.

BUCYRUS 30-B STEAM CLAMSHELL-CRANE, 45-foot boom. Good operating condition. Priced reasonable. Located New York. Box 36-SCC.

MODEL 20-B BUCYRUS GASOLINE CLAMSHELL MACHINE AND SHOVEL, shop number in 4800 series; mounted on full caterpillars; equipped with 36-foot clamshell boom and ¾-cubic-yard clamshell bucket; also a high lift gooseneck shovel boom and ⅞-cubic-yard dipper. Machine in good working condition. May be inspected at Omaha. Reasonably priced. Convenient terms may be arranged. Box 55-SCC.

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175-B ELECTRIC BUCYRUS COMBINATION DRAGLINE AND SHOVEL, 3-phase, 60-cycle, 440 volts, 3½-yard bucket.

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50-B STEAM SHOVEL Number 3046; equipped with 1-cubic-yard dipper, 26-foot boom, 1½-cubic-yard dragline bucket with 50-foot boom, caterpillar mounted, equipped for burning oil, located at Grand Prairie, Texas. Price very reasonable. Box 112-LSD.

50-B DIESEL DRAGLINE. New September, 1928; shop number about 10,075. Has 60-foot boom, 1¾-cubic-yard bucket; Kohler light plant. Located near New Madrid, Missouri. In excellent condition. Priced very reasonable for quick sale. Box 122-LSD.

175-B BUCYRUS STEAM SHOVEL, equipped with 75-foot boom, 48-foot dipper handle and 4-yard dipper. Machine located near Pittsburg, Kansas, and can be inspected at any time. Condition good; price open. Box 118-LSD.

50-B STEAM DRAGLINE, shop number about 4157, mounted on caterpillars and equipped with 50-foot boom and 13-foot extension. One-yard Williams Clamshell bucket and 1½-cubic-yard Page Class-C drag bucket, boiler retubed and machine equipped with electric light plant. Good working condition, location Detroit District, and ready for prompt delivery. Box 129-LSD.

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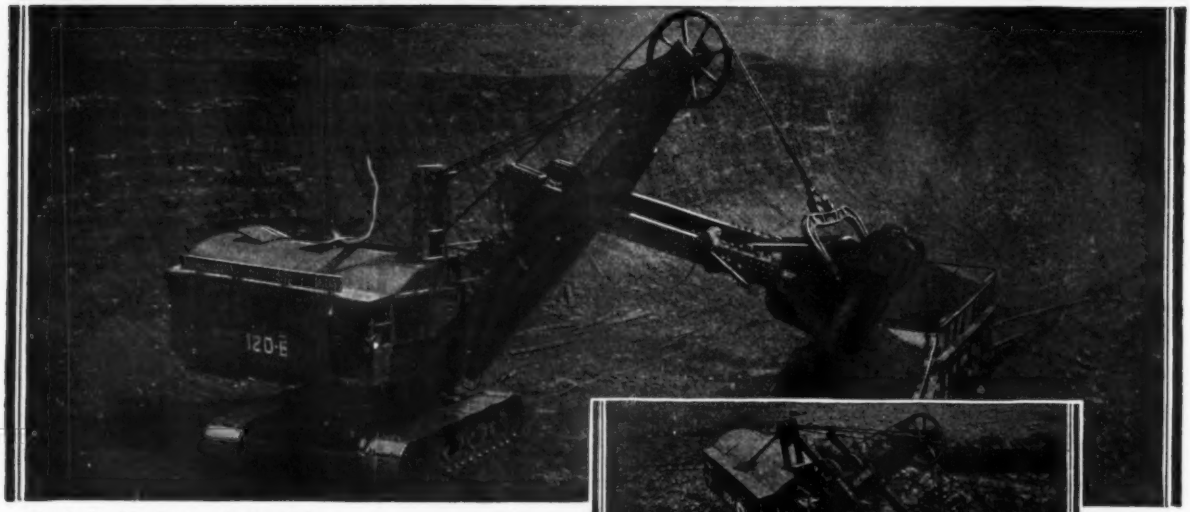

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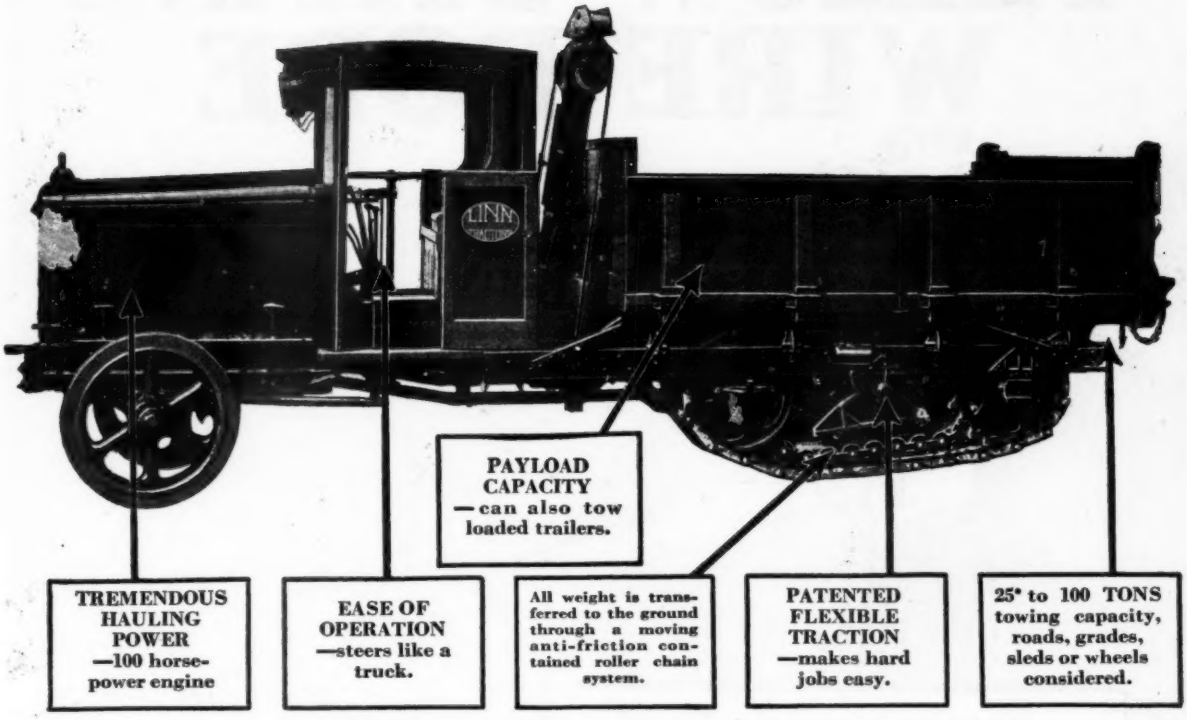
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No. 70-C BUCYRUS STANDARD RAILROAD TYPE SHOVEL, shop number 1300, 2¼-yard dipper, f. o. b. railroad tracks, shipping point Virginia. Address Box 320.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, shop number 912; 115-foot boom, 3½-cubic-yard Page bucket. Florida location. Box 73-LSD.

CLASS-24 BUCYRUS-ERIE STEAM DRAGLINE, 100-foot lattice-type boom, 4-yard bucket. Machine mounted on skids and rollers. Johnson locomotive-type boiler and two Page heavy-duty buckets purchased new for present job recently completed. Rig is in first-class condition, having been gone over completely after recent termination of actual contract work. Owner has no further work for this size and type machine. Location in Ohio. Box 11-LSD.

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BUCYRUS-ERIE 20-B DIESEL, 40-foot dragline boom and extra high lift shovel attachment, ¾-cubic-yard Type "S" Page bucket.
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CLASS-24 DIESEL-ELECTRIC DRAGLINE, shop number 911. Machine was originally shipped as steam, but in 1924 was converted to Diesel-Electric. At that time complete new revolving frame and Class 180 new roller frame was installed. Equipped with 115-foot boom and 3½-cubic-yard bucket. 150 H. P. Fairbanks Type "Y" engine, 125 K.W. generator; 100 H. P. hoist motor and 75 H. P. swing motor. Box 124-LSD.

CLASS-24 STEAM, OIL-BURNING DRAGLINE, 100-foot boom. Have also supply of new parts, including 600 new gum rollers. Reasonably priced, subject to buyer's inspection at Chelan, Washington. Box 51-LSD.

CLASS-14 STEAM DRAGLINE with 70-foot boom and caterpillar mounting. Box 102-LSD.

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50-B STEAM SHOVEL, equipped with 26-foot boom, 17-foot dipper handle, 1¾-cubic-yard dipper, on caterpillars. Also 50-foot boom dragline equipment. Shop number about 4304. New January 1925. Location northern Illinois. Priced to sell. Box 109-LSD.

ONE CLASS-14 STEAM DRAGLINE excavator, Number 3402, 70-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas. Priced very reasonable. Located at Grand Prairie, Texas. Box 110-LSD.

ONE CLASS-14 STEAM DRAGLINE excavator Number 3327, 60-foot boom, 2-cubic-yard bucket, caterpillar mounted, equipped for burning gas. Price very reasonable. Located at Texarkana, Texas. Box 111-LSD.

175-B STEAM SHOVEL, equipped with 75-foot boom, 48-foot handle, and 4-cubic-yard dipper. Recently rebuilt and in first-class condition, located in Southern Indiana. Priced for quick sale. Box 85-LSD.

MARION STEAM SHOVEL — Model 92, Railroad Type, Serial No. 3775, equipped with 1⅝-inch chain, 5-yard dipper. A-1 condition, new dipper sticks and roof completely overhauled. Any reasonable offer will be entertained. Subject to prior sale and inspection. Location near Kansas City. Box 105.

MODEL 50 MARION, railroad type, truck mounted, 2-cubic-yard manganese dipper, shovel; shop number about 1725. Located in Northern Indiana and is in excellent condition. Box 106-LSD.

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70-C STEAM SHOVEL located near Marietta, South Carolina, where it completed a railroad job? Bargain as supplementary shovel or as supply of spare parts. **Box 82-LSD.**

BUCYRUS 320-B STEAM STRIPPING SHOVEL, shop number 4205, new in 1925, used less than four years. Located at Toronto, Ohio. Box 74-LSD.

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ONE KOEHRING 13-E PAVER mounted on traction wheels, shop number 13270, actually used only few months, well protected and in excellent condition. Southern location. Very attractive price for cash. Box 107-ME.

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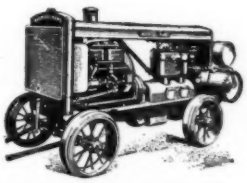

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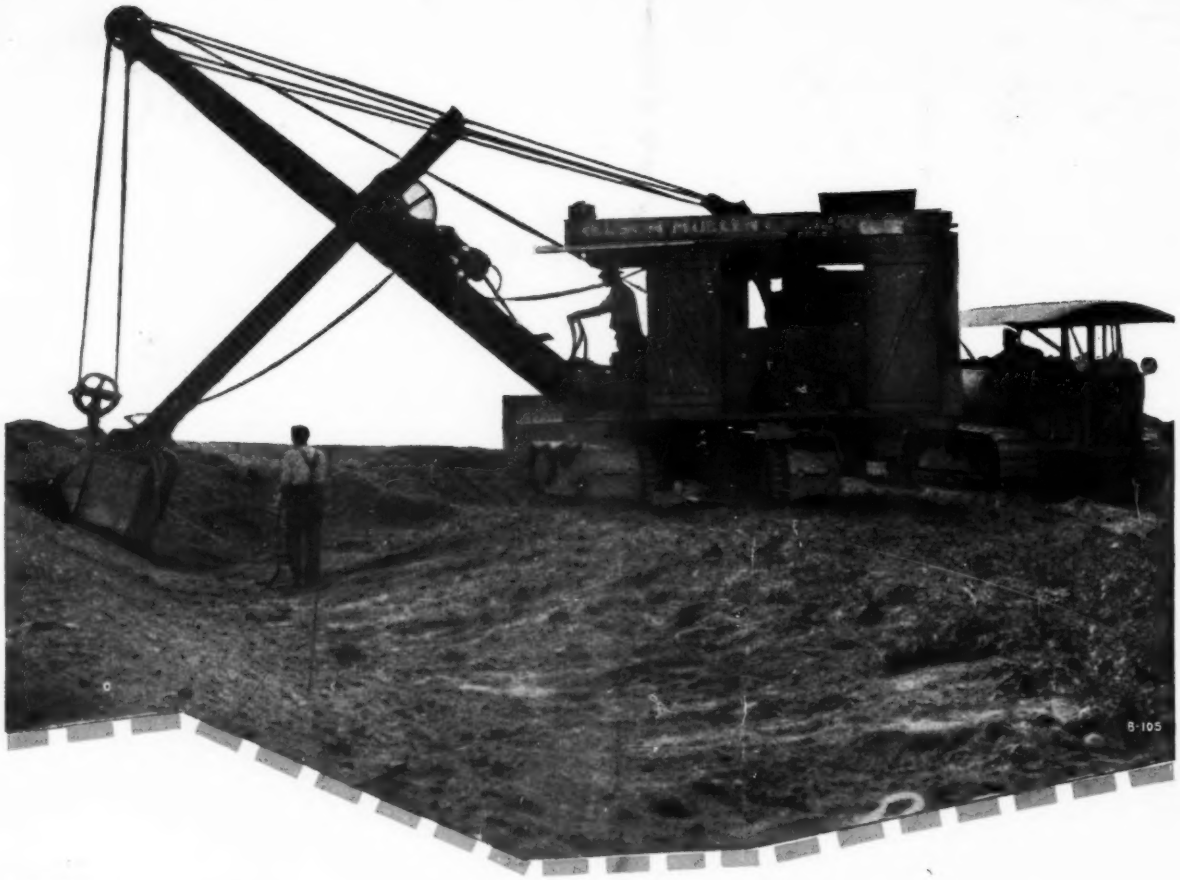

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